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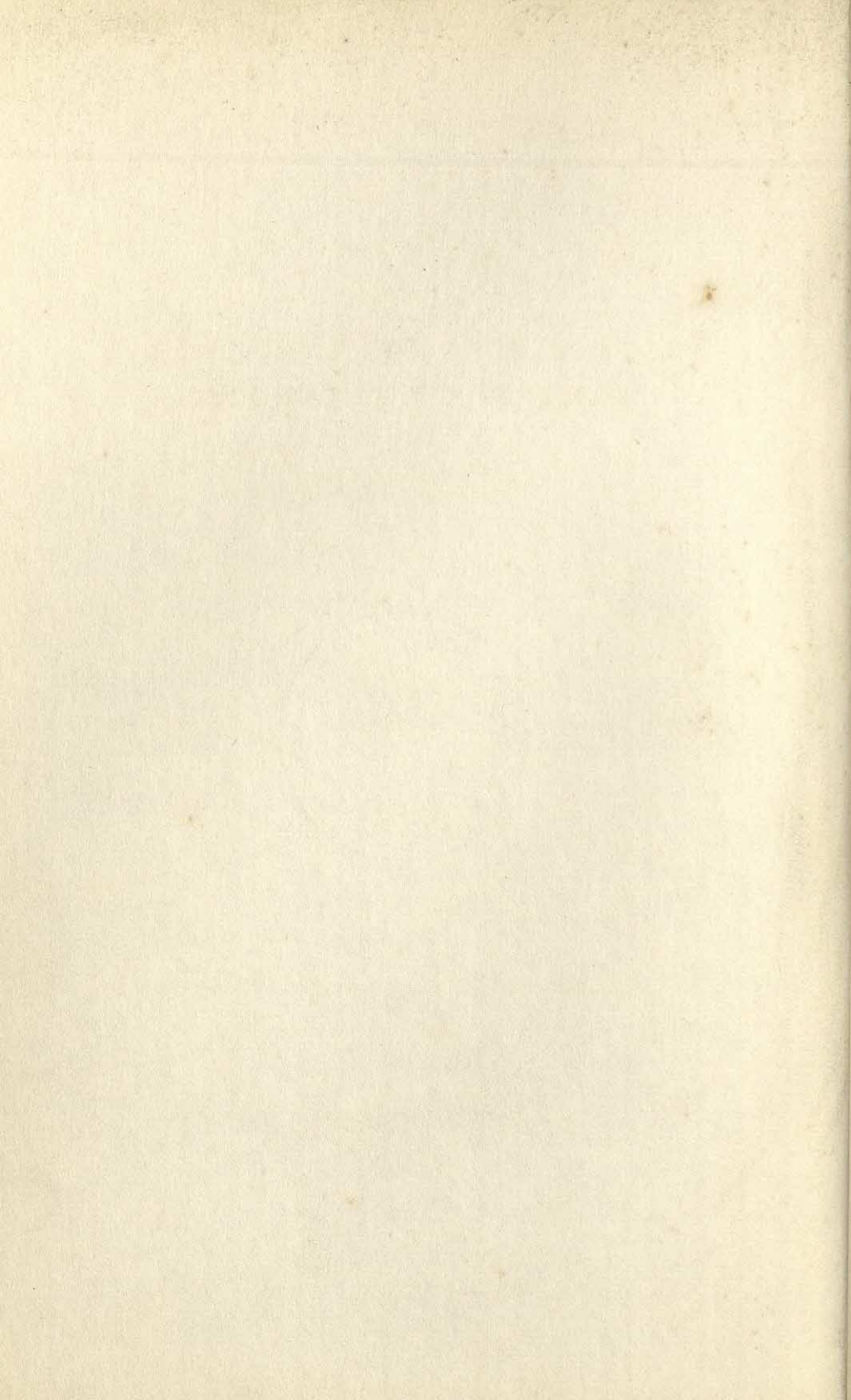
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The
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The
WORLD UNIVERSITY
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Unabridged



Volume II

STREICHER—VERLAINE

AN ILLUSTRATED TREASURY OF KNOWLEDGE

Publishers Company, Inc.

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Key to Pronunciation

VOWELS

ă (short), as in *hat, cat*.
ā (long), as in *ale, hate*.
ā (Italian), as in *car, mar*.
â (short Italian), as in *fast, class*.
ɑ (broad), as in *all, fall*.
â (circumflex), as in *care, snare*.
a or *q* (short obscure), as in *final, spinal*.
â (long obscure), as in *surface*.
ae, as in *Caesar*, = *ē*.
ě (short), as in *net, met*.
ē (long), as in *me, eve*.
ê (circumflex = *â*), as in *there*.
ẽ (tilde), as in *her*.
ɛ or *ɛ* (short obscure), as in *patent*.
ê (long obscure), as in *delay*.
ē = *ī*, as in *pretty*.
ī (short), as in *hit, bit*.
ī (long), as in *kite, mite*.
ī (tilde), as in *sir*.
î (short obscure), as in *habit*.
î (long obscure), as in *idea*.
ō (short), as in *pop, hop*.
ō (long), as in *cone, bone*.

ó (circumflex = *ā*), as in *for*.
ô (long obscure), as in *hero*.
ōō (short), as in *book, brook*.
ōō (long), as in *moon, spoon*.
ɔ = *û*, as in *word*.
ô = *ü*, as in *son*.
oe, as in *Phoebe*, = *ē*.
ũ (short), as in *rut, cut*.
û (long), as in *muse, fuse*.
û (circumflex), as in *turn, urn*.
û (long obscure), as in *unite*.

w is a vowel only after a vowel, when it forms the second element of certain diphthongs, as in *few, how*.

ÿ (short) = *ī*, as in *hymn*.
ÿ (long) = *ī*, as in *by, cry*.

CONSONANTS

c (hard) = *k*, as in *cat, cape*.
ç (cedilla) = *s*, as in *cell, façade*.
ĝ (hard), as in *dog, gave*.
ĝ (soft), as in *gem, gentle*.
ķ for the German *ch*, as in *ich, Bach* (*bäk*); also = *e*

ŭ for the German *ü*, as in *Blücher, Grünberg*.
ö for the German *ö*, as in *Göttingen*.
ñ for the French *n*, as in *bon, Bréton* (*brâ-tôn'*).
th (soft), as in *path*.
TH (hard), as in *the, father*.
ñ for the sound of *ny*, as in *canyon*.

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Streicher (*shtrī'kēr*), JULIUS, German editor and politician, born in Fleinshausen, Germany, Feb. 12, 1885; executed at Nuremberg, Oct. 16, 1946. He took part in Hitler's beer-hall *Putsch* in November 1923, and published (1923-45) *Der Stürmer*, a monstrous anti-Semitic weekly in which he published pornographic material. In 1945 he was captured by U.S. troops and sentenced by the international war crimes tribunal (see *Nuremberg Trials*).

Streitberg (*shtrīt'bērĕk*), WILHELM, German linguist, born at Rüdesheim, Germany, Feb. 23, 1864; died at Leipzig, Aug. 19, 1925. He taught at Freiburg, Switzerland, and at Leipzig, Münster, and Munich, Germany. In 1891 he and Karl Brugmann founded *Indogermanische Forschungen*, for a long time the principal linguistic journal of the world. In 1896 he instituted the Germanische Bibliothek and, in 1912, the Indogermanische Gesellschaft. He wrote "*Urgermanische Grammatik*" (1896), "*Gotisches Elementarbuch*" (1896), and "*Gotische Bibel*" (1908-10).

Strength of Materials (*strēngth of mā-tēr'ī-ālz*). See *Stress*; *Sclerometer*; *Scleroscope*.

Streptococci (*strēp-tō-kōk'sī*), in medicine, bacteria which generally appear in the form of long stretched chains. They cause the development of pus, and are often found in cases of angina.

Streptomycin (*strēp-tō-mī'sīn*), an antibiotic (bacteria-killing) substance produced by the microbe *Streptomyces griseus* which lives in soil. It was first isolated (1943) by Dr. S. A. Waksman (*q.v.*) and associates of the department of microbiology of the N.J. Agricultural Experiment Station of Rutgers Univ., who sought an antibiotic substance which would be effective against certain disease germs not controlled by the sulfa drugs nor by penicillin. Streptomycin is particularly effective against Gram-negative bacteria, while penicillin is most effective against Gram-positive bacteria. Streptomycin is basic in nature, while penicillin is acid. Streptomycin, in a white powder form, is soluble in water, but insoluble in ether, chloroform, and acetone. It is non-toxic when properly administered.

Among some of the Gram-negative bacterial infections against which streptomycin has demonstrated its effectiveness are: Typhoid and paratyphoid fevers, undulant fever (which is Bang's disease in animals), cholera, tularemia (rabbit fever), influenzal meningitis, *B-coli* and *proteus* infections of the urinary tract, and tuberculosis where scar tissue has not yet been formed so extensively that it keeps the drug from getting at the infection. Favorable results have also been reported from the use of large amounts of streptomycin against the Gram-positive *Diplococcus pneumoniae* (which causes one form of pneumonia), and *Staphylococcus aureus*.

Stresemann (*shtrā'zē-mān*), GUSTAV, statesman, born in Berlin, Germany, May 10, 1878; died there, Oct. 3, 1929. He was educated at the universities of Berlin and Leipzig. Later he became associated with a number of industrialists, among them Hugo Stinnes. In 1907 he entered the Reichstag as a member of the National Liberty party, and in 1917 he became the leader of the party. In 1923 he formed a ministry and relinquished the policy of resistance against the occupation of the Ruhr district by France and Belgium. Later, as minister of foreign affairs, he was instrumental in negotiating the Locarno Pact and the admission of Germany as a member of the League of Nations. His negotiations included those for the evacuation of the Rhine and the Saar Valley. He was most influential in Germany's acceptance of the Dawes and Young Plans (see *Reparations*). Although his policy was apparently one of conciliation, he did nothing to prevent Germany's industrial and military leaders from planning for world domination. He shared the Nobel Peace Prize (1926) with Aristide Briand (*q.v.*), who, probably more than any other statesman of his time, helped Stresemann to secure a place among the great powers for Germany. Briand, however, later expressed his belief that Stresemann had taken advantage of Briand's desire for world peace.

Stress (*strēs*), the ratio of the force to area over which the force is applied. Stresses applied to materials may produce tension, compression, torsion, or bending. Every stress tends to distort an elastic body. According to a famous law discovered by the English scientist, Robert Hooke (1635-1703), the stress applied to a body is proportional to the distortion as long as the elastic limit is not exceeded. The elastic limit is the stress which would cause the body to become permanently distorted. See also *Elasticity*.

Strike (*striĕk*), a concerted and temporary cessation of work pending the adjustment of an industrial dispute. The strike differs from quitting, in that strikers continue to claim the job as theirs and will attempt to prevent other workers from serving as replacements. Essentially, the strike is an economic weapon, designed to induce the employer to come to terms by withdrawing the supply of labor. Although most strikes are called by unions, occasionally unorganized workers, with or without the help of unions, may go on strike.

Strikes may result from disputes over wages, hours, working conditions, or questions of union organization. Since the decision of the Supreme Court upholding the constitutionality of the National Labor Relations Act in 1937, there has been a downward trend in the number of strikes caused by disputes over union representation. Since strikers appear to be taking the offen-

sive, it is sometimes forgotten that many strikes are called as purely defensive action: that is, to prevent the employer from decreasing wages, increasing hours of work, or worsening working conditions. Thus, many strikes take place when a period of business recession is setting in and employers attempt to use the opportunity to reduce their labor costs.

In most instances, the strikers leave the employer's premises (a walk-out) and establish a picket line in front of or around the establishment. By picketing or patrolling, the strikers hope to persuade the employer by cutting off the supply of prospective employees, of customers, and of materials. The picket line may also serve to keep up the morale of the strikers. For many years, American courts placed severe limitations on picketing, even when it was truthful and peaceful. In *Thornhill v. Alabama*, decided in 1940, the Supreme Court declared that picketing, when it was truthful and peaceful, was covered by the constitutional guarantee of freedom of communication. However, violent and coercive picketing or the utterance of falsehoods on the picket line may still be enjoined by the courts.

For a few years during the 1930's, the *sit-down strike* was in great vogue in the U.S. Instead of leaving the plant, the workers remained inside, sometimes for several weeks, effectively preventing production by denying access to the plant to strikebreakers ("scabs") and company officials alike. For the most part, the sit-downs were peaceful and involved no physical destruction of plant or equipment. Following the ruling of the Supreme Court that such strikes were illegal and that workers who participated in them were not entitled to reinstatement to their jobs under the National Labor Relations Act, the sit-down strikes substantially disappeared. A variant of the sit-down is the "folded arms" strike, in which workers come to the plant in the morning, but remain at their work places without doing any work.

Workers sometimes resort to the *slow-down strike* or the strike on the job, which involves more or less curtailment of plant operations and may sometimes involve sabotage. An interesting illustration of the slow-down strike occurred with the Fifth Avenue Coach Co. in New York City: on several occasions, the drivers concertedly fell far behind their time schedules and effectively tied up the whole line.

Strikes which are begun without the consent of the local or of the international union are called *wild-cat* or *outlaw strikes* or *stoppages*. Such strikes are often spontaneous in nature, arising out of the dissatisfaction of workers with conditions. In some instances, the parent union has itself undertaken to break the strike by sending union strikebreakers into the affected area; this was illustrated by the behavior of the Print-

ing Pressmen's Union in the web pressmen's strike in New York City in the early 1920's.

A strike by a union which is not itself engaged in a labor dispute but which uses its economic power to assist another union is known as a *sympathy strike*. Very widespread sympathy strikes take on the aspects of a *general strike*. Most students regard the true general strike as primarily a political, rather than an economic, weapon, having as its principal function the coercion of government, rather than of employers.

The legality of the strike has been a question of major importance. While the right of the individual worker to leave his employment at will, for any or no reason, has been conceded in all but the most exceptional cases, the concerted cessation of work was generally held to be a criminal conspiracy up to about the middle of the 19th century. Since that time, the legality of the strike has depended on its purpose. The general rule is that if the purpose of the strike is lawful, the strike is lawful. Courts differ, however, as to what lawful purposes are; they agree that strikes for wages, hours, working conditions, etc., are lawful, but they often disagree over strikes for the closed shop and related issues. In a famous opinion, delivered in 1926, Supreme Court Justice Brandeis said, "The 14th Amendment does not confer the absolute right to strike." Thus, strikes designed to collect stale claims or motivated by extortion are illegal. The National Labor Relations Act itself protects the right to strike, by providing that the act was not to be construed as in any way impairing the right to strike.

The accompaniments of a strike are attacked more often than the strike itself: for example, picketing, distribution of union literature, holding of union meetings, distribution of strike funds, etc. Municipal ordinances such as those designed to prevent disturbances of the peace or blocking of traffic or creating public nuisances are often used against the incidents of a strike. Hostile governments may also use the police and the troops against strikers, as well as permit employers to use private strike-guards, whose employment often leads to violence and bloodshed. The Memorial Day (1937) "Massacre" in Chicago and the Pullman Strike 1894 illustrate the former; the Ludlow "Massacre" in Colorado in 1913 is an example of the latter. While there have been many strikes by public employees (such as policemen and street cleaners), the great weight of legal authority is to the effect that such strikes are unlawful. Even President F.D. Roosevelt (*q.v.*) declared, in the middle 1930's, that no one has the right to strike against the government. The constitutions of most unions of public employees specifically surrender resort to the strike.

At various times and in various industries, limitations have been placed on the right to

STRINDBERG

strike. "Cooling-off periods" are provided by the Railway Labor Act as well as by the laws of some states like Minnesota; such laws require a waiting period between the announcement of an intention to strike and the actual commencement of the strike. The War Labor Disputes Act (Smith-Connally Act) of 1943 prohibited strikes unless approved by a majority of the workers in a secret ballot conducted by the National Labor Relations Act. Such legislation as the Taft-Hartley Labor-Management Relations Act (passed in June 1947) affects any possible strike situation. Organized labor has strenuously resisted all proposals for compulsory arbitration which would of course seriously limit the right to strike.

In the reconversion period after World War II, there occurred a sharp increase in the number of industrial disputes and in their severity; e.g., in 1945, more strikes occurred than in any preceding year except 1944, and the number of workers involved was greater than in any year since 1919. These strikes, and numerous others occurring in steel, automobiles, and electrical equipment, arose out of the desire of workers to maintain the take-home pay of the long hours during the war and to make up for sharply increased living costs.

Partly as a result of these numerous strikes, significant steps have been taken both by the Federal government and several states to limit strikes. Riders to departmental appropriations for Federal departments and agencies, beginning with 1946, prohibit payment of salaries to individuals belonging to organizations claiming the right to strike against the government. In 1947, New York State passed the Condon-Wadlin Act imposing severe penalties on individual employees of the state or its subdivisions and instrumentalities engaging in strikes. Other states have banned jurisdictional strikes and strikes in violation of a collective bargaining agreement, unless approved by the international union to which the strikers belong. In other cases, attempts have been made to bar strikes unless a majority of the employees, voting by secret ballot, have decided to strike. Mention should be made, too, of laws which provide for cooling-off periods: that is, the strike may not begin until after 30 or 60 days' notice of intention to strike has been given.

The Taft-Hartley Act does not repudiate labor's right to strike, but provides certain rules which unions must follow. The Government's right to seek court injunction in certain cases and other provisions of the law may result in a long "cooling-off" period which has a definite bearing on the development of a strike. See also *Arbitration; Labor; Labor Injunction; Labor Legislation; Norris-La Guardia Act; United States*.

Strindberg (strīnd'bērg), JOHAN AUGUST, playwright and novelist, born in Stockholm,



JOHAN AUGUST STRINDBERG

Sweden, Jan. 22, 1849, died there May 14, 1912. Strindberg grew up in poverty and struggled as a tutor, actor, journalist, and librarian before completing his first great play, "Master Olof" (1872). Between 1883 and 1887, he traveled all over Europe, especially in France and Germany, and most of his later works appeared simultaneously in Swedish and German. Among his later plays are "The Father" (1887), "Lady Julia" (1888), "To Damascus" (in three parts, 1898-1904), "Crimes and Crimes" (1899), "Easter" (1901), "Dance of Death" (1901), and "A Dream Play" (1902). Besides his plays, Strindberg published after 1877 many short stories and novels which in stark realism described the life of the European Bohemian (e.g., "Red Room," 1879), and of bourgeois life (e.g., "The New Kingdom," "Married," 1884). Of his later sketches, those dealing with the life in Sweden (e.g., "The Inhabitants of Hemsö," 1887), and his autobiographical novels, "The Son of a Servant" (1887) and "A Fool's Confession" (1893), are the most important.

Although strongly influenced by the other great Scandinavian playwright, Henrik Ibsen (q.v.), Strindberg himself became one of the greatest literary influences upon European literature at the turn of the century. His plays and stories are characterized by a merciless realism and bitter ironical skepticism, attacking everything that was considered sacred during the late Victorian era. Not only religious and social concepts, but also the sex life of women, their hypocrisy, and their social ambitions were sharply criticized by Strindberg. It would be superficial to trace this attitude to his unfortunate personal experiences—three divorces—or to his inferiority complexes originating in his lowly birth or to his mental disturbances. Although these factors

certainly contributed to his bitterness, it was his whole philosophy of life that dictated his attitude.

Sritch (*stritch*), SAMUEL ALPHONSUS, cardinal in the Roman Catholic Church, born in Nashville, Tenn., Aug. 17, 1887; died in Rome, Italy, April 27, 1958. He was graduated from St. Gregory's Coll., Cincinnati, Ohio, in 1904 and in 1910 from the American Coll. in Rome and was ordained a priest. Returning to the U.S. he served (1910-17) as a pastor at Memphis and Nashville and was successively appointed bishop of Toledo (1921), archbishop of Milwaukee (1930), and archbishop of Chicago (1939). In 1946 he was raised to the dignity of cardinal, and on March 1, 1958, he was appointed Proprefect of the Sacred Congregation for the Propagation of the Faith, one of 12 Congregations of the Church.

Strombus (*ström'būs*), the name of the shells of various mollusks, all of which have a more or less conic spire. These shells are found on a number of species of gastropod mollusks. The largest, known as the fountain shell, weighs from 4 to 5 lbs. It is used in making cameos and certain porcelain work.

Strontium (*strôn'shî-ûm*), a metallic element (symbol, Sr; atomic number, 38; weight, 87.63) belonging to the alkaline earths. It has a pale yellow color, decomposes in water, and burns with a crimson flame. In nature it is found in various combinations but is closely associated with barium and calcium. It occurs in the ashes of certain plants and in sea and mineral waters. Its chief use is in the making of fireworks, because it burns with a bright red flame.

A radioactive strontium isotope (Sr^{90}), which undergoes negative beta decay (*i.e.*, emits an electron) with a half life of 20 years, is produced (in relative abundance) in nuclear-weapons detonations. Nuclear explosions to date are said to have released about 100 lb. of Sr^{90} into the atmosphere, of which about half has been deposited on the earth as fall-out. The hazard from Sr^{90} is not primarily from the effects of its radiation (0.531 Mev electrons) absorbed externally by human beings but arises from the deposition and retention of Sr^{90} within the body. Being chemically similar to calcium, it is deposited with calcium in the bones, presenting a danger to the bone marrow (which is involved in the formation of blood) and to adjacent tissues.

Concentrations of Sr^{90} in milk have recently aroused some anxiety, because milk forms a large part of the diets of children. The U.S. Atomic Energy Commission, however, minimizes the hazard. See also *Atomic Fall-out*.

Strophanthus (*strô-fân'thûs*), a genus of plants native to tropical Asia and Africa. The seeds of a certain species of strophanthus furnish strophantin, a highly valuable drug used as a cardiac stimulant in medicine.

Strozzi (*strôt'sê*), the surname of an old Ital-

ian family dating back to the 14th century in Florence, Italy. Members of this noble family are credited with founding the first public library in Florence, as well as the beautiful Strozzi Palace, the latter built around 1489 and bequeathed to Italy in 1907. The Strozzi opposed the power of the Medici in the 16th century.

Struther (*strûTH'êr*), JAN, writer, born JOYCE ANSTRUTHER, in London, England, June 6, 1901; died in New York City, July 20, 1953. Educated in London, Jan Struther started writing verse and prose at 16. She was married twice, to Anthony Maxtone Graham in 1923 and to A. K. Placzek in 1948. During World War II, she and her children made their home in New York City, where Miss Struther appeared on the radio. She contributed articles, fiction, and verse to the *London Times* and to *Punch* and published books of poetry and several novels. More popular in the U.S. than in England, she was best known for her sensitive and humorous portrayal of British upper middle-class family life in "Mrs. Miniver," which was made into a successful motion picture (1943) with Greer Garson in the title role.

Struve (*strôo've*), FRIEDRICH GEORG WILHELM VON, astronomer, born at Altona, Germany, April 15, 1793; died at St. Petersburg, Russia, Nov. 23, 1864. He studied in the Univ. of Dorpat, in Russia, and in 1839 was made director of the observatory at Poltava, near St. Petersburg. His works on astronomical subjects deal largely with double stars, of which he discovered about 500, and the nature of the Milky Way.

Strychnine (*strîk'nîn*), an extremely poisonous compound derived from several species of the *Strychnos nux vomica* trees or shrubs, native to tropical regions. These plants, of the family *Loganiaceae*, have opposite leaves and dense, aggregated clusters of white, bell-shaped flowers. They occur in the tropical parts of America and Asia and yield, besides strychnine, brucine and other powerful drugs. Strychnine is a white, crystalline compound and in small doses is a stimulant, but in larger quantities is a powerful poison and causes tetanic spasms. It has been in use since 1818, when it was discovered in St. Ignatius' beans. See *Poison*.

Stuart (*stû'êrt*), or STEWART, a royal family of Scotland and England, so named from the office of steward of Scotland. It appears that the house was founded at the time of David I, of Scotland, who made Walter, the son of a Norman baron, the steward of his household, and afterward the name of Steward became attached to his family. It was written in this form until Mary, Queen of Scots, went to France, when the form of Stuart was adopted by her and afterward retained by her descendants. Walter, the sixth steward of Scotland, married Marjory, the daughter of King Robert I, in 1315, and by



Courtesy National Gallery Art, Mellon Collection

THE SKATER

PAINTING BY GILBERT STUART

this union the crown of Scotland became vested in his family in case the royal line should otherwise become extinct. Robert, son of Walter, became the seventh steward and, as David II died without issue, he succeeded to the throne of Scotland in 1371 as Robert II. Fourteen Stuarts occupied the Scottish throne between 1371 and 1714, and six of that house became sovereigns of England. James VI (1566-1625), succeeding Queen Elizabeth as James I, was the first Stuart to rule England. Queen Anne was the last Stuart to occupy the throne of England and was succeeded by the Hanover dynasty. The connection between the Stuart and Hanover families is through Sophia, electress of Hanover, who was the granddaughter of James VI.

Stuart, CHARLES EDWARD. See *Charles Edward*.

Stuart, GILBERT (CHARLES), painter, born in North Kingstown, R.I., Dec. 3, 1755; died in Boston, Mass., July 9, 1828. He became interested in sketching when a boy and later studied painting at Edinburgh, Scotland. His benefactor, Cosmo Alexander, died while Stuart was in Scotland and he was compelled to work his way home in a ship. He went to England in 1775, where, in 1777, he became a pupil of Benjamin West, and in 1785 set up a studio of his own. He at-

STUBBS

tained stature among English painters and in 1792 returned to America. He worked mostly in Philadelphia until 1803, when he established a studio in Washington, and two years later moved to Boston. Well known for his portraits of Jefferson, Madison, Martha Washington, and other famous contemporaries, Stuart will always also be noted for his portrayals of George Washington. The three versions—the so-called "Vaughan" type (bust-length), the "Atheneum" type (head), and the "Lawnsdowne" type (full figure)—of which Stuart himself has painted replicas, have become the best-known and most authentic portraits of the first President.

Stuart, JAMES EDWARD, pretender to the English throne, born at St. James' Palace, London, June 10, 1688; died at Rome, Jan. 2, 1766. He was a son of James II of England and his second wife, Mary Beatrice, and was involved in the exclusion of his father from the throne. The Jacobites undertook to place him on the throne by force of arms in 1715, but the rising was soon put down and Prince James, as he was generally called, escaped to France. Later he resided in Rome, and in 1719 married a granddaughter of John Sobieski, King of Poland. Charles Edward (*q.v.*), the Young Pretender, was a son of Prince James.

Stuart, JAMES EWELL BROWN, soldier, born in Patrick County, Va., Feb. 6, 1833; died in Richmond, Va., in May 1864. After being graduated from the U.S. Military Acad. in 1854, he served in the cavalry in Texas and Kansas. At the beginning of the Civil War he resigned his command to enter the Confederate cavalry in Virginia. He fought at Bull Run, Antietam, Fredericksburg, and Gettysburg. He was later made major general and had command of the cavalry under Lee, and in that capacity rendered gallant service in the battles of the Wilderness. He was wounded at Yellow Tavern, where he attempted to check Sheridan's advance, and died soon after.

Stuart, MOSES, clergyman and scholar, born in Wilton, Conn., March 26, 1780; died at Andover, Mass., Jan. 4, 1852. A Yale graduate, he studied law, but soon turned to theology. In 1806 he became pastor of a Congregational church at New Haven and in 1810 professor of sacred literature at Andover, a chair he held for 38 years. His first publication was a Hebrew grammar, the type for which he had to set himself. He taught himself German in his spare time, becoming the first American to win recognition for German scholarship in the U.S. Among his writings are "Grammar of the New Testament" and "Hints on the Interpretation of Prophecy."

Stubbs (stübz), WILLIAM, bishop and historian, born in Knaresborough, England, June 21,

1825; died Apr. 22, 1901. After attending the Ripon grammar school, he entered Oxford Univ., being graduated from the latter with high honors in 1848. He was soon elected a fellow of Trinity Coll. and two years later became a clergyman at Navestock. In 1866 he was selected as professor of modern history at Oxford, became bishop of Chester in 1884, and five years later was transferred to the see of Oxford. He became widely known as a lecturer and historical writer.

Stucco (*stûk'ô*), a kind of plaster prepared of a mixture of a ground chalk, or marble, with pure lime as a cement, in such proportions and so worked as to procure a durable and uniform surface susceptible of polish. It is used for covering walls and for making internal decorations, and a mixture of coarser material with cement is employed for external work. Sometimes pulverized alabaster or gypsum is used instead of marble, mixed with rich lime, carefully slaked and sifted, and then troweled on a rough coat until the surface is perfectly smooth. Other varieties are made of plaster of Paris, mixed with a saturated solution of alum or sulfate of potash, then dried in air and baked at a dull red heat. This preparation is pulverized and sifted and is then slaked with a solution of alum. Several kinds of stucco were used by the Greeks and Romans for decorating public buildings, both internally and externally. In modern times it is used to finish ceilings and as an exterior finish for homes. It is often brightly painted, especially on the exterior of tropical homes.

Studebaker (*stû'dê-bâk-êr*), JOHN WARD, public official, born June 10, 1887, in McGregor, Iowa. He was educated at Leander Clark Coll. (Toledo, Iowa) and at Columbia Univ. In 1914, having spent several years as a school principal in two small Iowa towns, he went to Des Moines as assistant superintendent of schools, becoming superintendent in 1920. He left in 1934 to take the position of U.S. Commissioner of Education. One of Studebaker's principal interests was adult education and as education commissioner he organized a nationwide program of adult public forums through the public-school systems. Instrumental in providing additional educational opportunities for handicapped children and in promoting the use of radio for educational purposes, he organized a national-defense training program in the schools which later became a war training program. He left public service in 1948 to become an executive for a firm of educational magazines. Studebaker wrote "The American Way" (1935), "Plain Talk" (1936), and numerous textbooks.

Stupor (*stû'pêr*), in medicine, the state of complete or partial unconsciousness and insensibility, combined with complete or partial immobility.

Sturgeon (*stûr'jûn*), a genus of ganoid fishes, having five rows of bony shields and four barbels

in a transverse row before the small, tubeless mouth. The snout is long and pointed, the body is elongated, and the eyes and nostrils are on the sides of the head. The gill covers are large, the fins are well developed, and the snout is covered with bony plates. In the spring the salt-water species ascend the rivers to spawn and return to the sea in the autumn. There are also fresh-water species. The species vary in size and somewhat in general characteristics, but the flesh of nearly all is edible. A kind of pressed and salted food called *caviar* is made of the roe, and a fine grade of isinglass (*q.v.*) is obtained from the air bladder.

Sturgeons are mostly sea fish, but are found in large numbers in the bays and larger rivers. Important sturgeon fisheries occur off both the Atlantic and Pacific coasts of North America, and a fresh-water species is common to the Great Lakes, where it is caught in large quantities. The common sturgeon of America and Europe is from 6 to 12 ft. long. A familiar species of the Gulf of Mexico, the *shovelnose*, is peculiar for its prolonged snout. The most important sturgeon fisheries of Europe are in the Caspian and Black Seas, where the *white sturgeon* is found in abundance. It attains a length of 20 to 25 ft. and a weight of 3,000 lbs. It yields most of the isinglass and caviar of the market. The *sterlet* is found in the Volga and Danube and is seldom more than 3 ft. long, but is noted for its delicate flesh. Lake Baikal, in Siberia, has important sturgeon fisheries.

Sturgis (*stûr'jûs*), RUSSELL, architect and author, born near Baltimore, Md., Oct. 16, 1836; died Feb. 11, 1909. He studied architecture in New York City and later in Europe, and from 1865 until 1880 practiced his profession. Among the buildings designed by him are Lawrence Hall of Yale Univ., the Homeopathic Medical Coll., and the Flower Hospital, in New York City. He was made professor of architecture and the art of design in the Coll. of the City of New York in 1878, but on account of ill health resigned after two years and traveled extensively. In 1885, he was editor of decorative art and medieval archaeology of the "Century Dictionary," and subsequently was an editor of "Webster's International Dictionary" and the "Dictionary of Architecture and Building." He also wrote several books.

Sturluson (*stûr'lû-sön*), SNORRI. See *Snorri Sturluson*.

Sturm (*shûdorm*), JOHANNES VON, educator, born at Schleiden, Germany, Oct. 1, 1507; died March 3, 1589. He studied in Leyden and Louvain and in 1537 founded the Gymnasium of Strasbourg, of which he was principal until 1580. This institution acquired a wide reputation under his administration and was ultimately converted into a university. His system of education exerted great influence throughout Germany and was made the basis of the institutions at Eton and Rugby, Eng-

land. Sturm emphasized the study of ancient Greece and Rome and the maintenance of strict discipline.

Stuttgart (*stüt'gärt*), a city in Germany, capital of the *Land* (state) of Baden-Württemberg, situated on the Neckar River, about 115 m. n.w. of Munich. Stuttgart is an important transportation and manufacturing center, producing automobiles and automobile parts, machine tools, precision instruments, optical parts and cameras, textiles, leather, paper, chemicals, foodstuffs, and musical instruments. It is also a center of the German book-publishing trade. Because of its industry, it was heavily bombed during World War II, resulting in the destruction of 45 per cent of the city's structures, including many of its old buildings, a modern railway station, and the city hall. The city's notable institutions include an academy of fine arts, a technological institute, a conservatory of music, and the state theater.

Stuttgart, which was chartered in the 13th century, became a residence of the counts (later dukes and in 1806 kings) of Württemberg in 1320. In 1482 they made it their capital, but it was not until the late 19th century that the city rapidly expanded into a commercial center. After World War I, Stuttgart became famous for the construction of functionally designed buildings, particularly residences. In World War II, it was captured by French troops in 1945 and was later incorporated into the American zone of occupation. Population, 1956, 612,200.

Stuyvesant (*stī'və-sant*), PETER, director general of New Netherland, born in West Friesland, the Low Countries, in 1592; died in New York, February 1672. In 1635 he entered the service of the Dutch West India Co. and was sent to Brazil and the Dutch West Indies, becoming governor of the latter in 1643. His right leg was amputated as the result of a wound he received in an expedition against the island of St. Martin in 1644, and he returned home to recuperate in 1645. In 1646 he was appointed director-general of New Netherland and arrived in New Amsterdam (now New York City) in 1647. He tried to promote and expand friendly trade relations with the English in Connecticut and at the same time to build up New Amsterdam. In 1650 he negotiated a treaty with the English by which the boundary between New Netherland and Connecticut was settled. In 1655 he led an expedition against the Swedish settlement of what is now known as New Castle, Del., and annexed the territory.

Stuyvesant, who did much to strengthen the colony internally and economically, was intolerant of religious groups in the colony other than the Dutch and reluctant to give the people a voice in the government. In 1653, however, local

self-government was granted by proclamation. In 1664, when an English fleet appeared off New Amsterdam and demanded its surrender, Stuyvesant wanted to resist, but the townspeople were opposed to fighting. He surrendered the city to the English at his farm, the Bouwerij, from which a New York City street derives its name—the Bowery. In 1665 he went to Holland to defend his actions while colonial governor but returned to America in 1667.



New York Historical Society, N.Y.

PETER STUYVESANT

Contemporary painting

Style (*stil*), a comprehensive term which includes all visible expressions created by a certain period, by a certain society, or even by a certain individual. Thus, we speak of the style of the 5th century B.C., or the style of the French court, or the style of Leonardo.

The word style is derived from the Greek *stylus*, a metal writing instrument. Thus, originally style meant the form of written expression in the sense of the style of a letter or of a poem. Today, however, style is used with an all-embracing meaning. Not only are a language and its literature stylized, but also all of the arts and applied arts (furniture, textiles, jewelry, fashion, etc.). The meaning of the word style, in fact, even goes beyond expressions in art and finally includes all characteristics of form, so that we may speak of a style of walking, of dancing, of eating, of handwriting, and of greeting.

Since forms as expressions of human feelings are best articulated and most clearly visible in the arts, however, we base our concept of styles primarily on works of art. Thus, mention of the Gothic style makes us think first of the great cathedrals built in that age in France, Germany, and England. If we have visualized them fully, we will be able to find traits common to certain

architectural elements of the cathedrals and, for example, to the way the garments of the figures of saints are arranged or the way in which they hold their hands and their heads. This means that we are able to recognize the Gothic style in sculpture. From there, we may be able to recognize similar traits and trends in contemporaneous paintings and so find out what Gothic painting is. If we have exactly defined the characteristics of the Gothic style in works of art, we will find in Gothic writing, in Gothic dancing, and in Gothic costumes preferences for certain movements which are depicted in art works, a specific rhythm which is peculiar to this time, etc. That is, we will be able to discover a Gothic style in the daily life of this period, even before the characteristics of this life have been crystallized in works of art. So, the pointed arch, the crossed vault, the buttress do not make the Gothic style; they are only the architectural expressions of something much more general and comprehensive.

While the Gothic style is just one of the many historical styles, we can also speak of the style of specific countries. Thus, there exists a French, a German, an English, or a Spanish Gothic. The art works belonging to these different national Gothics all have some characteristics in common, which are what we call Gothic, but they also show national peculiarities. These national peculiarities reappear in all periods and so we can speak of national, or country, styles as well as of period styles.

Furthermore, we can speak of sociological styles. A bourgeois society will always produce works of art which show certain characteristics that are definitely bourgeois and different from the peasant style, or from the nomad style or the court style, regardless of the country or period in which they occur.

And finally, there is personal style. Every expert will be able to distinguish between the symphonies of two different musicians, even though they may have lived at the same time in the same country and even in the same stratum of society. And style is not restricted only to artists. Almost every human being has his own personal style, so that we can speak of the style of Mr. John Doe, thinking of his way of walking or writing letters or greeting his friends, of his table manners or his exclamations of joy and sorrow. His stylistic expressions, in the same way as if he were an artist, will be formed by the period in which he lives, the nation to which he belongs, his social circumstances and, finally, his individuality.

Various scholars have developed various theories as to the origin of style. One theory is that the peculiarities of a material and of a technique are the main causes for style—that, for

example, the geometrical forms of Egyptian art are mainly caused by the hard granite in which the sculptors had to work. This explanation, however, does not explain the equally geometrical movements of painted Egyptian figures. These lead us to suppose that the Egyptians stylized their own movements this way. Another explanation supposes, on the contrary, that there is a certain will for a specific expression in each time, country, and individual, that every material has many possibilities for handling, and that the form into which it is finally brought depends entirely on the concept of the man who does the work. Thus, according to this explanation, the differences between the Inca and the Renaissance style do not lie in the various materials, constructions, techniques, instruments, and purposes but in a different forming will. The instruments, techniques, and materials are selected to correspond to this primary idea of what is beautiful, an idea which changes from period to period, from country to country, from person to person.

See also *Architecture; Art*; and color plates on architecture in Volume XII; on costumes in Volumes III and IV; on rugs and furniture in Volume X.

Stylites (*stīlīts*), or PILLAR SAINTS, a class of Christian saints of the early church, who occupied lofty pillars as an evidence of penance. This practice was indulged in to realize the two fundamental ideas of Christianity, separation from the things common to this world and aspiration after those of heaven. The pillars were high columns with platforms mounted on their tops, so limited that the occupants were obliged to stand continually in the open sky, and were protected only at the sides by a railing. Simeon the Syrian (A.D. 390-459) was the first stylite, and commenced the practice at Antioch about 420. There he spent more than 30 years on a pillar having a top only a few feet square. The pillar was only about 10 ft. high when he began this practice, but it was afterward increased to 50 or 60 ft. It is not certain whether he ever descended from his pillar or not. It is mentioned that he wrote epistles and cured the sick by his touch, but it is also recorded that there was a ladder reaching to the platform on which he lived, so that visitors may have come to him. After his death, the stylites became numerous and the practice continued until the 16th century, although it abated somewhat after the 12th century.

Styptic (*stīp'tik*), any substance which stops bleeding by contraction of capillary blood vessels. Styptics are also called astringents. Those in common use for small wounds are alum, as in "styptic sticks" or "surgical powder," tannic acid, salts of iron, copper, and zinc, or alcohol. Styptics should not be confused with other anti-bleeding materials such as Vitamin K or thrombin prepa-

rations, which stop bleeding, not by constriction of blood vessels, but by clotting the blood itself.

Styrene (*stī'rēn*), an unsaturated hydrocarbon (*q.v.*). It is a liquid with a boiling point of 145.2° C. and a freezing point of -30.63° C. Its specific gravity is 0.9045 and its molecular weight 104.14. The chemical formula is C_8H_8 . It was first produced by distilling gum storax in 1831; and it is now produced commercially by the pyrolysis of ethyl benzene or of chlorinated ethylbenzene. Styrene polymerized with butadiene produces a commercially important synthetic rubber. Styrene polymerized with heat and catalysts produces polystyrene, a plastic material usually prepared in the form of molding powder for the fabrication of bottle caps, liquid battery cases, funnels, refrigerator parts, etc., for which its resistance to acids and water makes it desirable. Its high dielectric value also qualifies polystyrene for use in high-frequency insulating cable and as foil in condensers.

Styx (*stīks*), in Greek mythology, a river of the lower regions, which flowed around Hades seven times. Across this stream the shades of the departed were conveyed by Charon, a bearded boatman. It was so named from Styx, the daughter of Oceanus, who dwelt in a grotto at the entrance of Hades. The sea goddess Thetis dipped her son Achilles (*q.v.*) in the River Styx and thereby rendered him invulnerable, except in the right heel, by which she held him.

Subconscious (*süb-kōn'shūs*) or UNCONSCIOUS, in psychology, the total of human emotions, feelings, thoughts, and desires which do not become clearly conscious. There is not one definite "subconscious" but many gradually shaded regions of mental phenomena which are more or less deeply buried beneath and covered by consciousness. The subconscious directs to a large degree our behavior, temperament, and moods. Dreams may reveal layers of our subconscious. Thus Sigmund Freud (*q.v.*) developed his psychoanalytic method of psychotherapy, the physician aiding the patient by gradually uncovering subconscious mental processes. Long before Freud popularized the unconscious, philosophers had dealt with it. Leibnitz (*q.v.*) called it "*petites perceptions*" in his "Monadology," and in the 19th century both Schopenhauer and E. von Hartman (*qq.v.*) considered the problem. Hartmann wrote a whole "Philosophy of the Unconscious."

The important role of the unconscious in the origin of religion and art is nowadays carefully examined. Modern art, in analogy to primitive art, leans more and more toward stressing its immediate expression. Modern authors, from Arthur Schnitzler to Franz Kafka and James Joyce (*qq.v.*), have introduced the "stream of consciousness" technique in writing, just to create

opportunities for the unconscious to reveal itself. See also *Psychiatry*.

Subject (*süb'jekt*), in grammar, the word or group of words in a sentence which signifies that of which anything is predicated or affirmed. The subject of a sentence is a noun or pronoun, or a word or phrase equivalent thereto. It is in the nominative (*q.v.*) case.

Subjective (*süb-jěkt'iv*), term applied to a thought or opinion originating in an individual's mind, as opposed to *objective*, something actually existing outside the mind.

Subjectivism (*süb-jěkt'iv-iz'm*), in philosophy, the doctrine which supposes that individual observation and thought of the human ego determine the shape of the outer world. Hence, objective rules in knowledge, ethics, and aesthetics cannot be formulated, since there exists no objective test of validity.

Subjunctive (*süb-jünk'tiv*), in grammar, the form of a verb indicating a mood which states things or actions as hypothetical, *e.g.*, "If I *were* king."

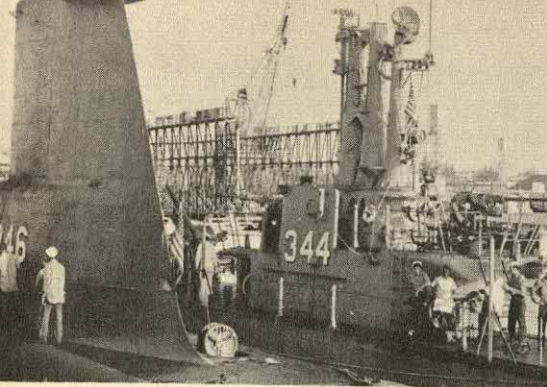
Sublimation (*süb-lī-mā'shūn*), a process of distillation in which the vapors condense in a solid form. In this process solid substances are converted into vapor through the agency of heat and on cooling again assume a solid form, when the resulting substance is called a *sublimate*. The process occurs naturally in fissures and craters of volcanoes and the products are deposited upon the walls. The number of mineral substances that vaporize by heat and become solid again on cooling is large. Camphor, benzoic acid, and other vegetable substances possess the same property. Sublimation is employed in the arts and manufactures as a means of separating volatile from fixed bodies, usually for obtaining the former in a purer state. Some sublimates assume a solid and compact form, such as camphor and the sublimates of mercury, while others form a fine powder, called *flowers*, as the flowers of sulfur. In some cases the vapor is changed chemically by contact with the oxygen of the air; these sublimates have a different composition from the original body, as when oxide of zinc is produced by subjecting the metal, or its ores, to heat exposed to the air.

Sublime Porte (*süb-līm' pōrt*), or OTTOMAN PORTE, the name of the Turkish government until 1918. The term is French for "lofty gate," and refers to the old oriental, especially Byzantine custom of building lofty gates at the palaces where government affairs were administered. See also *Istanbul*.

Submachine Gun (*süb-mā-shēn' gūn*). See *Machine Gun*.

Submarine (*süb-mā-rēn'*), a boat which is so fitted that it can be submerged and propelled under water. In 1771, David Bushnell of Con-

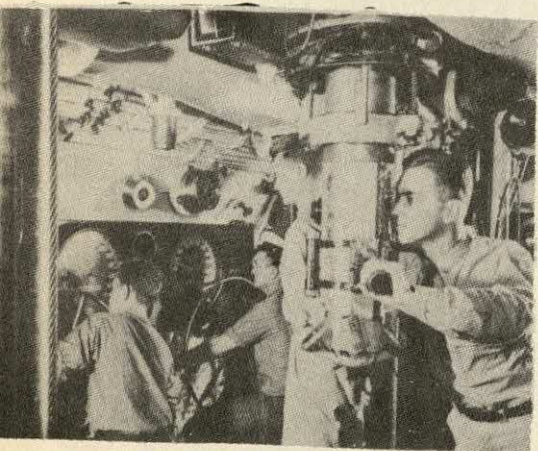
SUBMARINE



All pictures official U.S. Navy Photos

TWO TYPES OF SUBMARINES

The conning tower of a Guppy-type submarine, the U.S.S. *Corporal* (SS 346), is shown in the foreground with a standard fleet-type submarine beside it. The Guppy-type boat has a clean superstructure and hull as the result of the removal of deck guns, the recessing of deck fittings, and the streamlining of the conning-tower structure. In contrast, the wartime fleet-type submarine, as exemplified by the *Cobbler* (SS 344), has a cluttered deck



CENTRAL CONTROL ROOM

While the submarine is submerged, a lookout is kept through a periscope

necticut suggested plans for a one-man undersea craft which was afterward built and operated during the Revolutionary War. This was the first important attempt to use a submarine in warfare. Robert Fulton, better known for designing the first successful steamboat, also constructed a practicable submarine, the *Nautilus*, about 1800. Over half a century elapsed, however, before any further important steps were taken toward the development of this type of vessel. During the Civil War, several crude submarines engaged in attacks which were usually unsuccessful. The best known of these, the *David*, destroyed the U.S.S. *Housatonic* in 1864. She was not actually operated as a submarine but as a low, freeboard torpedo boat. Sinking four times, the *David* lost 32 out of the 36 men of her crews.

An Irish-born American, John Philip Holland, experimented with small submarines as early as 1875, producing (1881) the *Fenian Ram* which was successful in a trial launching but which had power defects making extended operation impossible. Holland perfected his design, offering in 1898 the *Holland*, first submarine to be powered by internal-combustion engines for surface operations and electric motors for use when submerged. One of Holland's submarines, the *Holland No. 9*, was purchased by the U.S. Navy in 1900 and was the Navy's first active submarine. Simon Lake (*q.v.*), an American inventor, also contributed greatly to the development of the submarine, building the *Argonaut* (1897), the first submarine to navigate successfully in the open sea. At the turn of the century, however, submarines were adopted by France, England, the U.S., and Germany, the latter country contributing the diesel engine. The combination of the self-propelling torpedo and the submarine made the submarine a factor to be reckoned with in warfare, giving it an effective weapon for under-water use. This was first demonstrated when Germany introduced intensive submarine warfare in World War I.

Submarines in use today are effective against enemy warships of all types and against merchant ships or convoys. During their short life as warships, submarines have sunk a greater total of ships during war than have all other destructive agents combined. Their principal weapons are torpedoes, though they are also generally armed with one or two guns. World War II saw the use of a submarine equipped to carry and launch (by catapult) small scouting airplanes. Fish-shaped to resist the pressure of water on all sides, submarines have decks, on which the guns are mounted, as well as a conning tower. Below deck a typical arrangement consists of watertight compartments, divided by watertight doors: forward torpedo room; forward battery compartment (in which are housed the storage batteries which furnish power for the electric motors during submerged operation); central control room (regulating flooding of the tanks and the diving rudders, and containing a periscope, through which those in the submerged craft view the scene above the water); after battery compartment; engine room (containing the diesel engines and the electric motors); and after torpedo room.

The cruising radius of a submarine is large. Speed above the surface averages about 18 knots, below the surface, 8 knots or more. A submarine is submerged by means of diving tanks, which, when empty, hold the vessel buoyant and above water, and by the use of diving rudders (bow and stern planes); when the tanks are filled, the vessel is weighed down and sinks beneath the surface. To return to the surface, water

SUBMARINE SIGNALING

is forced from the tanks by compressed air. The average limit to the time a submarine can remain submerged using battery power and without access to fresh air is about 36 hours. During World War II both U.S. and Axis submarines normally ran submerged only during daylight hours, and then only if exposed by active antisubmarine measures or if in imminent danger of detection.

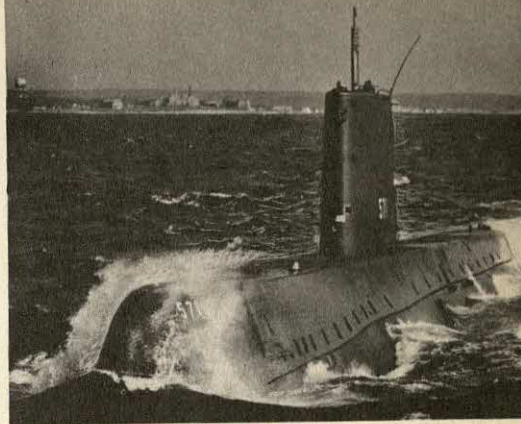
Submarines have a displacement ranging from 480 to 1,525 tons on the surface and from 624 to about 2,000 tons submerged. Over-all length averages 200 to 380 ft.; crews generally comprise about 30 to 90 men.

During World War II many innovations and developments were applied to submarines, greatly affecting future designs. A long tube (*Snorkel*) extending to the surface was used to supply the engines with air and discharge exhaust gases. Automatic float valves prevent the entry of sea water. This device enables a submarine to cruise for long periods while submerged at periscope depth. Other developments include high emergency underwater speeds, greater diving depths, and new types of propulsion equipment.

The modern submarine performs many functions other than those of a mere fighting vessel. During World War II submarines rescued many downed airmen, transported supplies to areas not reachable by surface vessels, and landed personnel on enemy-held islands. They also performed photographic reconnaissance, provided radio navigation beacons in otherwise inaccessible places, mined enemy-controlled waters, and launched rocket attacks on coastal areas. Since 1954, when the first nuclear-powered submarine—the *Nautilus*—was launched, the construction program of such warships and that of radar-picket and Polaris missile-firing submarines has been stepped up. See also *Navy*; and color plate, *Fighting Ships Through the Ages*, Volume XI.

Submarine Signaling (*süb-mä-rën' šig-näl-īng*) or ECHO SOUNDING, a method of determining the depth of water in which a ship is floating. See also *Sonar*; *Sounding*.

Subtraction (*süb-träk'shūn*), one of the four basic operations of arithmetic. When Mary has 10 cookies and is to give John 4 she takes away 4 cookies from the 10 and has 6 left. Mary has performed a simple subtraction. Mary may meet subtraction in other situations; for example, if she has 6 cents and wishes to buy a 10-cent balloon, she may think, "6 and how many are 10?" This second way of thinking of subtraction is often used as the definition of subtraction. Thus, when b is subtracted from a , denoted $a - b$, the remainder is defined as the number c which is such that $b + c = a$. The number a is called the *minuend*, and the number b is called the *subtrahend*. Addition and subtraction are said to be inverse operations, since, if the addi-



Official U.S. Navy Photo

THE U.S.S. NAUTILUS

First of a group of submarines powered with energy produced from nuclear fuel, the *Nautilus* was launched early in 1954. Because it is equipped to stay submerged indefinitely, many tests were carried out before it was commissioned to determine how crews might react to lengthy periods of virtual imprisonment.

tion of the number b to a is followed by the subtraction of b , the result is the original number a , thus $(a + b) - b = a$. Subtraction facts are learned along with those of addition in the elementary school, and the meaning of subtraction is extended as fractions, negative numbers, irrational numbers, etc., are introduced into mathematics.

Subtrahend (*süb'trà-hënd*). See *Subtraction*.

Subway (*süb'wā*), an underground electric railway. The first subway in a modern sense was conceived and planned in 1864, although it was not actually undertaken until 1901. Called the "Broadway Underground," it ran from City Hall to 145th Street in New York City. The lines were later expanded to include branches under the East River to Brooklyn and to the Bronx. Since its beginning of operation in 1904, the New York City subway system, which is now the largest in the world, has been expanded to include three separate lines, covering 734.42 m. of track (exclusive of car yards). Other American cities which have subway systems are Philadelphia, Boston, Chicago, and Newark. Paris, Berlin, London, Buenos Aires, and Moscow are the major foreign cities with subway systems.

Sucker (*sük'ēr*), a genus of soft-rayed fishes of the carp family, usually having a protrac-tile mouth, with thick and fleshy lips adapted for sucking in food. About 30 species are found in the fresh waters of America, of which the *common sucker* is the most abundant. It attains a length of 12 to 18 in. and, like other species of suckers, is hard to catch with a hook, owing to its difficulty in taking bait. The *buffalo sucker* is 2 to 3 ft. long and is found in the large rivers of the Mississippi Valley. These fishes are somewhat bony, but quite well flavored. They are caught mostly with nets. The largest of the genus

is the *Missouri sucker*, which is from 2 to 4 ft. long.

Suckfish (*sūk'fish*), SHARK-SUCKER, or REMORA, a genus of fish. On the dorsal surface of the head, suckfish have a disk by which they attach themselves by suction to sharks and other fish, even to ships. They detach themselves only in order to get food.

Suckling (*sūk'ling*), SIR JOHN, poet and courtier, born in Whitton, Middlesex, England, baptized Feb. 10, 1609; died, reportedly by suicide, in Paris, in June 1642. An ardent supporter of King Charles I, he is best remembered as the author of a few delicate, lighthearted love poems, including "Why so pale and wan, fond lover?"

Sucre (*sōō'krā*) or CHUQUISACA, the nominal capital of Bolivia, situated on a tableland 8,975 ft. above the sea, 125 m. s.e. of Lake Poopo Choro. (The administrative capital is La Paz, (*q.v.*) Among the noteworthy buildings are the cathedral, the national university, and the school of industrial arts. The city was founded by Pedro Azures, an officer of Pizarro, in 1538 on the site of an Inca town called Choque Chaka, meaning "bridge of gold." The surrounding mountains contain valuable deposits of minerals, especially silver, and forests are located around the head of the Pilcomayo River, near Sucre. The city's manufactures include clothing, jewelry, furniture, and hardware. The residents are mostly of Spanish ancestry, with many Indians. Population, 1950, 40,128.

Sucre, ANTONIO JOSÉ DE, soldier and statesman, born in Cumaná, Venezuela, Feb. 23, 1795; assassinated near Pasto, Colombia, June 4, 1830. He fought against the Spanish in South America (1810 *et seq.*). The most gifted of the generals of Simón Bolívar, he liberated Ecuador through the victory of Pichincha in 1822 and gained the final victory over the Spanish at Ayacucho (1824). In 1825 he convened a deliberative assembly which proclaimed the *Republica Bolívar*. He was elected president of the new republic in 1826 but resigned two years later. As Colombian supreme commander, he defeated an invading Peruvian army at Tarqui (1829). As president of the constitutional convention (1830) of the first state of Colombia, Sucre attempted to prevent Venezuela from seceding, but he was unsuccessful.

Sucrose (*sū'krōs*), the chemical name for common sugar, $C_{12}H_{22}O_{11}$, a carbohydrate. Sucrose dissolves very readily in water. On warming in a solution containing acids, sucrose is converted into invert sugar, a mixture of dextrose (glucose) and levulose (fructose), both $C_6H_{12}O_6$ but having their atoms arranged differently. Invert sugar does not crystallize so readily as sucrose and is therefore used in fondants and other candies. See also *Sugar*.

Suction (*sūk'shūn*), the process of exerting a force upon a liquid by withdrawing air from a

tube or pipe dipping into the liquid. The atmosphere exerts a pressure upon the exposed surface of the liquid and forces the liquid into the evacuated pipe. In the suction pump, a piston operating in a cylinder removes a portion of the air. The atmosphere forces the water from a well through a pipe into the pump. Because the atmosphere will not raise water to a height greater than 34 ft., this type of pump cannot be used for wells of greater depth.

Sudan (*sōō-dān'*) or SOUDAN; the Arabic name of a vast region in Central Africa, actually a geographical term for that part of Africa stretching from the Atlantic Ocean to the Red Sea, from the Sahara and Egypt to the Gulf of Guinea and the central equatorial regions. The region includes that part of Africa with a predominantly Negro population that adopted the Moslem religion. The area forms three geographical divisions: Western, Central, and Eastern.

Western Sudan includes a large part of the Niger and Senegal valleys and states that are members of the French Community. The drainage is to the Niger River. See *French West Africa*.

Central Sudan includes the northern part of Nigeria, Cameroons, and the Congo and Chad republics, the last two members of the French Community. The drainage is mostly to Lake Chad, which has no outlet to the sea, but a part of the southern region is drained into the Niger and Congo rivers. See *French Equatorial Africa*.

Eastern Sudan, formerly known as the Anglo-Egyptian Sudan, now comprises the republic of Sudan (*see below*). The drainage is to the Nile.

The Sudan region is moderately elevated, with rolling plains and level plateaus; there are elevated highlands in the southwest. In the northern part are sandy wastes extending from the Sahara, but the interior is well-watered and arable.

The distribution of plant and animal life in the Sudan is greatly varied, owing to vast differences in the soil, climate, and distribution of moisture. There are elephants in the swamp regions of Lake Tchad, rhinoceroses in the Wadai, crocodiles in the large rivers, and zebras, antelopes, giraffes, and wild asses in the eastern steppes, as well as vast numbers of hippopotami, monkeys, serpents, birds, and fish in other regions.

Sudan, a republic of northeastern Africa, bounded on the n. by Egypt, on the e. by the Red Sea and Ethiopia, on the s. by Kenya, Uganda, and the Belgian Congo, on the w. by French Equatorial Africa, and on the n.w. by Libya.

The country, formerly known as the Anglo-Egyptian Sudan, comprises an area of 967,500 sq. m. Its geographical features are the same as



MOUNTAIN REGION IN THE SUDAN

The terrain of the Sudan ranges from fertile plains to sandy wastes

described under the Sudan region (*see opposite page*). The population, mainly Arab and Negro, numbers (1956) 10,226,000 and is largely semi-nomadic. The predominant religion is Mohammedanism, and Arabic is the national language. Schools are increasing in number. The higher institution of learning is the university at Khartoum, the capital (pop., ca. 93,000). Sudan leads the world in the production of gum arabic. Ivory, meat products, leather, pottery, metalwork, and buttons are other products. Gold, gypsum, salt, and timber are natural resources of importance. Agricultural products include cotton, millet, wheat, oilseeds, corn, barley, fodder crops, and livestock. The railroad mileage is 2,138 (1955), and the river system open to transportation comprises 2,619 m.; there are only a very few all-weather roads.

The region was first brought under Egyptian control early in the 19th century, but a native revolt, which broke out in 1882, all but ended Egypt's power. The rebellion, led by the Mahdi (*q.v.*), was finally ended by the English in 1898, and a year later an Anglo-Egyptian condominium was established. In 1953 Great Britain and Egypt consented to native demands for self-determination, and the Sudan gained independence on Jan. 1, 1956. Since then, the country has joined the Arab League and the U.N. The government, since independence, has been largely unstable. Initially there was a constitution and a government of elected representatives. On Nov. 17, 1958, an army coup took place, and the commander in chief seized control of the government, dissolved parliament, and suspended the constitution.

Sudanese Republic (*sōo-da-nēz'*). *See French West Africa.*

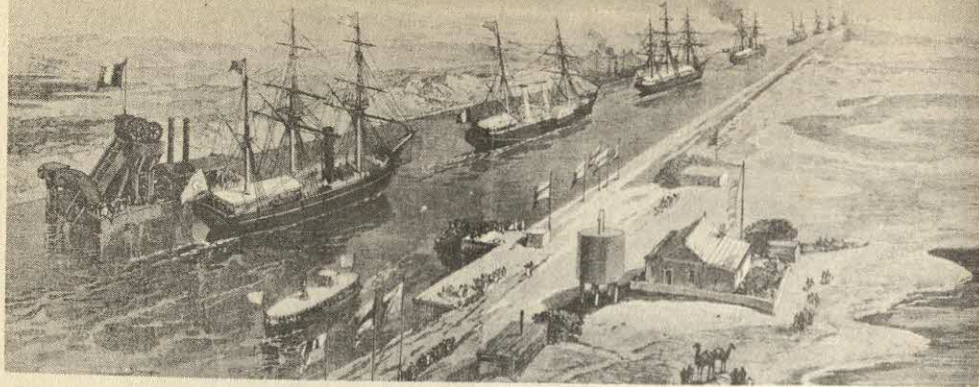
Sudermann (*zōo'dēr-män*), HERMANN, novelist and dramatist, born in Matziken, East Prussia, Sept. 30, 1857; died in Berlin, Nov. 21, 1928. After obtaining a university education, he became a journalist in Berlin but soon took to fiction. His first novel, "Dame Care," appeared in 1887; his first real success came with the play "Honor"

(1890). The drama "Home" (also known as "Magda"), which appeared in 1892, was made famous in France by Sarah Bernhardt and was widely translated. He wrote many plays and novels and an autobiography, "Book of My Youth."

Sudentenland (*sōo-dē't'n-länd*), a territory of 8,719 sq. m. located in northwestern Czechoslovakia. Formerly part of the Austro-Hungarian empire, Sudetenland became a Czech border district with the formation of the Republic of Czechoslovakia in 1918. Bordering on the German frontier and having a German majority in its population, the Sudetenland territory was ceded to Germany in 1938 by the Munich Pact (*q.v.*). After World War II, however, the German-speaking inhabitants were resettled in Germany according to the terms of the Yalta agreement. Sudetenland territory was restored to Czechoslovakia in 1945. Population, 1939, 3,396,244. *See Czechoslovakia; Sudetes.*

Sudetes (*sōo-dē'tēz*), or SUDETIC MOUNTAINS, a chain of mountains in northern Czechoslovakia, extending 192 m. southeastward from the water gap of the Elbe River to a gap of the Oder River known as the *Moravian Gate*. The Moravian Gate separates the Sudeten chain from the Carpathian Mts. The highest of the ranges are the *Riesen* (Czech, *Krkonoše*) Mts. with an average altitude of 4,250 ft.; the loftiest peak in the *Schneekoppe* (*Sněžka*), 5,255 ft. above sea level. Rich deposits of minerals and coal are found in various parts of the system.

Sue (*sü*), (MARIE JOSEPH) EUGÈNE, novelist, born in Paris, France, Dec. 10, 1804; died in Annecy, France, Aug. 3, 1857. After studying medicine, he became an army surgeon (1824); he later went into the navy and in that service witnessed the battle of Navarino (1828). Upon inheriting a considerable fortune (1830), he turned to writing. His first popular success came with "The Mysteries of Paris" (1842). Sue is best known for "The Wandering Jew" (1844-45), which was widely translated. In 1850 he became a deputy in the French national assembly but was exiled for protesting against the *coup d'état*



OPENING OF THE SUEZ CANAL IN 1869

of Napoleon III in 1851 and retired to private life.

Suetonius Tranquillus (*swê-tô'nî-ŭs trâng-kwî'll'ŭs*) GAIUS, historian and biographer, born in Rome about A.D. 70; died about 140. As a young man, Suetonius practiced law. Later employed by the Emperor Hadrian, chiefly as a private secretary, he was dismissed in 121, apparently for some breach of court etiquette. The remainder of his life was probably devoted to literary pursuits. His chief work, entitled "Lives of the Twelve Caesars," gives an account of the 12 Roman emperors from Julius Caesar to Domitian. The domestic customs and gross excesses of the emperors are related minutely, but only a few parts of the work are extant.

Suez (*sôo-êz'*), a seaport in Egypt, located at the south end of the Suez Canal, on the Gulf of Suez, which leads into the Red Sea. In the 7th century, near the location of the present city, was a terminus for a canal extending from the Gulf of Suez to the Nile. The canal fell into disuse; however, today there is a canal from the Gulf to the Nile, at Cairo, which supplies Suez with fresh water. Suez is a trading and commercial center. Population, 1959, 108,250.

Suez Canal, a man-made canal in Egypt, constructed across the Isthmus of Suez, connecting the Red Sea with the Mediterranean. It is ca. 108 m. long, its minimum width is 197 ft., and

its depth is ca. 45 ft., which accommodates a draft of 34 ft. About 15,000 ships (chiefly oil tankers) pass through the canal yearly.

A canal linking the Mediterranean and Red seas existed in ancient times, perhaps as early as 1380 B.C. It is believed that this canal fell into disrepair but was restored several times, and that it then fell into disuse around the 8th century A.D. In the 18th century, when Napoleon was in Egypt, he considered building a canal across the isthmus, but it was not until 50 years later, under the leadership of Ferdinand de Lesseps (*q.v.*), that the modern canal was built.

De Lesseps, in his efforts to get support for the canal, faced opposition from Great Britain and Egypt. Egypt felt that a concession to build the canal would compromise Egyptian independence; and Britain opposed the canal because it saw it as a threat to British interests, particularly in India. Under Said Pasha of Egypt, De Lesseps succeeded in gaining a concession for 99 years from date of completion. The canal was begun in 1859. In November 1869 it was opened with great festivities, and 68 vessels under various flags made the first passage (see also *Aida*).

The economic and political consequences of the canal were enormous, since the canal shortened the route to East Africa, Asia, and Oceania and lessened the cost of transit. Originally, the shares in the canal were owned chiefly by France and Egypt, and it was managed by the Compagnie Universelle du Canal Maritime de Suez. Great Britain, shortly after the canal was opened, saw its importance for maintaining its empire. When the Egyptian Khedive Ismail became financially indebted, Britain, under Prime Minister Disraeli, seized the opportunity to buy a large part of Egypt's shares. In 1936 the British secured a 20-year concession from Egypt to establish a base at Suez to protect the canal, but troops were withdrawn beginning in 1954, because of increased national agitation. On July 26, 1956, the Suez Canal was nationalized by the Egyptian government. See also *Egypt*.

Suffolk (*sŭf'ŭk*), a city in southeastern Virginia, in—but politically independent of—Nanse-

FRENCH LAND AT PORT FUAD, EGYPT

Scuttled Egyptian ships closed the canal to all traffic after Anglo-French forces landed in the area in an effort to protect shipping during Israeli-Egyptian hostilities in November 1956



SUFFRAGE

mond County, on the Nansemond River, 20 m. s.w. of Norfolk. The city is served by the Seaboard Air Line R.R., the Norfolk and Western Ry., and two freight lines. Suffolk is best known as a peanut market. Other industries are meat-packaging and tea and coffee processing. The city was settled in 1720 and incorporated in 1910. Population, 1950, 12,339; in 1960, 12,609.

Suffrage (süf'rij). See *Woman's Rights*.

Sugar (shōōg'ēr), a sweet, crystalline compound derived chiefly from the juice of the sugar cane and sugar beet. However, it occurs in many other vegetables. Among the various sources of sugar are sap of some trees, the seed, flowers, and fruits of some plants, the juices of various roots and grasses, and the milk of animals. Sugar was first made from sugar cane in India, whence the art of manufacture was carried to Arabia, and later it was introduced by the Moors into Spain. The Spanish colonists brought sugar cane to the West Indies, where it proved a plant of great value, and in 1751 it was introduced for culture in Louisiana.

SUGAR CANE. The plant known as *sugar cane* is not met with a wild state, but is thought to be native of tropical Asia, where it was developed by carefully cultivating allied species of grasses. The leaves are broad, smooth, and from 3 to 5 ft. long. The stems have a shiny surface and grow usually to a height of 7 to 12 ft. Within the stem is a sweetish pith, which supplies the juice essential in the production of sugar. It requires a rich soil and an abundance of moisture during the growing season. Low land is the most suitable, especially where the soil is of a rich, alluvial character. The plants are propagated by cuttings of the top joints, which are planted in rows 5 to 7 ft. apart.

CANE SUGAR. About one-half of the sugar sold on the market is obtained from sugar cane. The stems are first stripped of their leaves and the seed tops are clipped off, and they are then cut a short distance above the ground. After the juice is pressed from the stems by means of a cane mill, it is conducted into tanks and carefully strained into a receptacle. From this it is drawn off into a series of pans to be evaporated by heat until it becomes granular, after which the dry sugar is separated from the syrup by means of machinery. In the ordinary process of evaporating the juices, common brown sugar is formed, usually called *raw sugar*, and this needs to go through a refining process before the higher grades of marketable sugars are obtained. This is done usually by dissolving the raw sugar in hot water, and, after adding a solution of lime or sulfuric acid, it is passed successively through bags made of cloth and through animal charcoal, which serve to remove all impurities and take out the color. The liquid mass is then boiled a second time to take out the dampness, and the sugar crystals resulting are perfectly white.



Courtesy Palmer Publications; N.Y.

SUGAR CANE FIELD

Source of one-half of the sugar supply

Granulated sugar is made by separating the syrup from the crystals in a machine that revolves rapidly. By placing small quantities of the granulated sugar, before it is completely dry, into molds and drying, *lump sugar* or *cube sugar* results. *Loaf sugar* is the product which is obtained when the refined liquid sugar is evaporated in pans. Many widely different processes are employed in manufacturing sugar, several distinct kinds of machinery being used in the making of the various classes of products. Cane mills are usually constructed with two or three rollers, between which the sugar cane is crushed and the juice is collected in pans below.

BEET SUGAR. Beet sugar is a product of the sugar beet, the juice of which yields from 10 to 20 per cent of sugar. It is made in practically the same way as cane sugar after the juice has been obtained by crushing the root. The product obtained from the sugar beet has entered largely into direct competition with that from the sugar-cane plantations of the West Indies, the East Indies, Australasia, and the tropical regions of America, Asia, and Africa. Russia and the Ukraine are the largest producers of beet sugar in the world, Germany ranking second, the U.S. third and France fourth.

OTHER CLASSES OF SUGAR. A fine quality of sugar is made from the sugar maple, especially in New England, Ohio, West Virginia, New York, Pennsylvania, New Brunswick, and Ontario. The sap of the sugar maple is obtained in

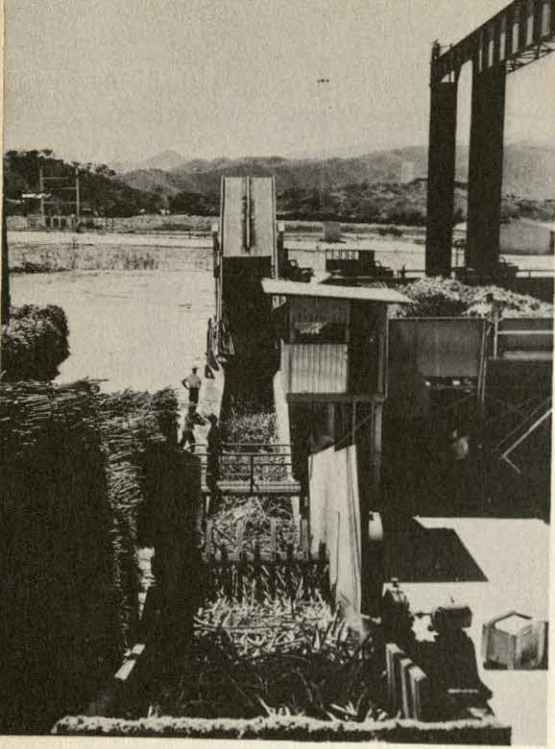


Photo Hamilton Wright

SUGAR CANE AT MILL

the spring as the sap flows upward, and is evaporated and treated quite like juice obtained from other sources. Large quantities of maple sugar are used in making confections. A class of sugar known as *jaggery* is obtained from several species of palms. It is a dark-colored raw sugar and is produced in comparatively large quantities. Other plants which yield sugar include the sorghum plant and the ordinary Indian corn (maize).

COMPOSITION OF SUGAR. Sugar is composed of various proportions of oxygen, carbon, and hydrogen. The constituents of all kinds of sugar are the same, but they differ materially in the relative quantities. *Grape sugar* occurs in the juices of various fruits, such as the currant, apple, peach, and grape. It varies in quantity from 1 to 15 per cent. *Glucose*, or *starch sugar*, is a kind of grape sugar and is made by boiling starch in sulfuric acid and water, the action of the acid being to unite some of the oxygen and hydrogen of the water with the carbon, thus forming a syrup. The acid is afterward removed by adding carbonate of lime, which operates to combine the sulfuric acid with the lime and thus frees the carbonic acid. Afterward the sugar is crystallized by boiling the mixture and thereby evaporating the water. Other sugars are those made of barley, honey, and various allied substances.

In 1958 (latest Census of Manufactures) there were 144 establishments (23,424 production workers) manufacturing beet sugar and raw cane sugar and refining cane sugar; the value added by manufacture was \$337,058,000.

SULFA DRUGS

See also *Beet; Molasses; Rum; Sorghum.*

Suicide (*sū'i-sīd*), the crime of a person who kills himself with malice aforethought. Suicide is uncommon, though not entirely unknown, among uncivilized peoples. It is resorted to more generally in the highly civilized countries than in those that rank as semicivilized, and the crime appears to have gained in extent more rapidly within the last century than at any other equal period in the world's history. Although the ancient Greeks and Romans did not regard suicide as a crime or even as dishonorable, it was less common anciently than now. This means of ending their lives was chosen by Demosthenes, Cleopatra, Hannibal, Mark Antony, and Themistocles. The Scriptures furnish numerous examples of suicides induced by revenge or remorse, such as those of Samson and Judas Iscariot.

The majority of suicides are known to be due to melancholy. An attempt to commit the crime is punishable in some countries, as in a number of states of the U.S. Formerly the laws of England demanded a forfeiture of the goods and chattels belonging to the suicide and the body was buried ignominiously.

Suicides are more numerous among men than among women, the proportion being about three to one. The greatest number occur between the ages of 45 to 55. Suicides are more numerous among single than among married people, and the rate is higher in large cities than in towns and country districts. The highest suicide rate occurs among divorced people.

Suleiman (*sōō'lā-mān*). See *Solyman 1*.

Sulfa Drugs (*sū'l'fā drūgz*). Anilin-sulfonyl chloride is the parent substance of all the sulfa drugs. It is prepared by the action of chlorosulfonic acid on acetanilid. When this aromatic sulfonyl chloride is treated with ammonia, it yields sulfanilamide, which is useful in cases of streptococcus infections. Treatment of the aromatic sulfonyl chloride with pyridin gives sulfapyridin, useful for pneumococcus infections. Aromatic sulfonyl chloride treated with thiazol produces sulfathiazole, useful in streptococcus infections. Over 5,000 sulfa derivatives have been produced and are being tested, and further research is continuing. Among these tested derivatives, sulfadiazine seems to be the least toxic of the sulfa drugs. Sulfaguanidine seems to be safe orally in large doses in cases of bacillary dysentery. The sulfa drugs are more or less toxic and should be used only according to prescription, by physicians who know the optimum doses and methods of administration and who can recognize signs of toxicity and institute proper corrective measures before serious consequences arise. The sulfa drugs can be given by mouth, by intravenous solution, or applied directly as in wound and certain intra-abdominal infections. Their action is bacteriostatic, *i.e.*, they in-

SULFUR

SULLA

Inhibiting growth and multiplication of bacteria present in the body so that the natural defense mechanisms may destroy and remove them. The sulfa drugs have no other therapeutic action; they are destroyed by a process of acetylation in the liver and excreted by the kidneys in the urine. The best action of these drugs is obtained by the maintenance of a certain constant blood level over a more or less definite period of time in order to prevent growth of serious bacterial infections and general systemic invasion or "blood poisoning" by organisms such as the streptococcus, staphylococcus, pneumococcus (pneumonia), meningococcus (meningitis), and gonococcus (gonorrhea). The importance of the sulfa drugs lies in the fact that they differ from all other antiseptic agents by being the first that could be safely administered internally against serious bacterial infections. Even before all the potentialities of this great group of chemotherapeutic drugs have been established, a new drug, penicillin (*q.v.*), has proved to be more effective and safer (less toxic side effects) against a greater variety of diseases caused by microscopic organisms. See also *Streptomycin*.

Sulfur (*sul'fūr*), or **SULPHUR**, a chemical element of atomic weight 32 and atomic number of 16. The substance is a lemon-yellow solid at room temperature, and has neither odor nor taste. It is widely distributed in nature, being present both in the free and combined conditions, and is a very important element, entering into chemical reactions with many elements and forming many useful compounds.

Extensive deposits of elementary sulfur are found in volcanic regions, as in Sicily, where it is mixed with pumice and other stones. Large deposits occur subterraneously in Louisiana and Texas. Sulfur is a constituent of many minerals such as iron pyrites (fool's gold), FeS_2 , galena (PbS), and gypsum ($\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$). Sulfur also occurs in organic substances, particularly in onions, garlic, horseradish, hair, wool, and eggs. As hydrogen sulfide (H_2S) it is found in some spring waters.

Elementary sulfur is obtained chiefly from subterranean deposits by the Frasch process. A set of concentric iron pipes are sunk to the sulfur-bearing strata. Superheated water (155°C.), for melting the sulfur, is forced down the outer pipe. A stream of compressed air is forced down a central pipe. The air and molten sulfur form a froth and are forced up through the middle pipe. The sulfur thus obtained is run into bins of 500,000 to 600,000 tons capacity and solidifies. It is exceptionally pure and thus requires no refining for most purposes.

Sulfur exists in the solid form in several distinct modifications, and in the liquid form as two different varieties. The solid form at room temperature is called *rhombic sulfur* (from its crystalline habit), and a solid form stable above 96°C. is

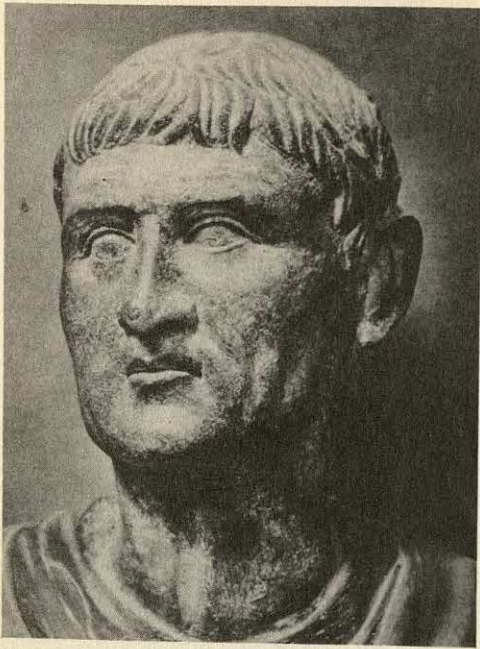
called *monoclinic sulfur*. A form of rhombic sulfur called flowers of sulfur is formed by condensing sulfur vapors. When sulfur is melted, at temperatures just above its melting point (114.5°C.) the liquid is straw-yellow in color and is believed to consist chiefly of a variety having a ring structure and containing 8 sulfur atoms per molecule (S_8); on heating to higher temperatures the ring structures rupture and combine to form long linear molecules (S_μ) which are dark in color and very viscous.

Sulfur reacts with many elements. It combines with practically all metals except gold, with the liberation of considerable heat and forms *sulfides*. Sulfur (brimstone) burns in air with a hot blue flame forming sulfur dioxide (SO_2), a common bleaching agent. The latter may be oxidized to sulfur trioxide (SO_3) and converted to sulfuric acid. Sulfur combines with other non-metals such as chlorine, forming covalent compounds. Elementary sulfur is used extensively in the production of chemicals, including sulfuric acid, sulfur dioxide, other sulfur compounds (*q.v.*), and is used in elementary form as an insecticide, in vulcanizing rubber, in manufacture of black gunpowder, and for many other purposes.

Suliotēs (*sul'i-tōs*), the name of a tribe who occupied the valley of the ancient Acheron, in European Turkey, where they settled in the 17th century to escape the oppression of the Turks. They were descended from Greek and Albanian shepherds and were named Suliotēs from the mountains of Suli in the south of Albania, where they supported themselves by raising cattle and farming. By the close of the 18th century they had increased to considerable numbers and were successful in resisting the attacks of the Turks. Their government was in the form of an independent republic, with the center of influence at the village of Suli, which was finally taken by the Turks in 1822; then the Suliotēs moved southward to different parts of Greece. Many served in the Greek war of independence, some in the force equipped by Lord Byron (*q.v.*). Marco Bozzaris (*q.v.*) made an effort to regain their former possessions, but he was ultimately forced to retreat into Greece. The Congress of Berlin, in 1878, recommended that the region formerly occupied by them should be annexed to Greece, but this recommendation was not complied with.

Sulky (*sul'kŷ*), a light vehicle with two wheels, fitted with a seat for one person and drawn by a single horse. Vehicles of this class are used extensively for training horses or driving them in races. The driver occupies a seat usually over the rear end of the shafts. Sulky of modern construction are very light.

Sulla (*sul'ā*), LUCIUS CORNELIUS, surnamed FELIX, Roman general and dictator, born 138 B.C.; died 78 B.C. He became a quaestor in 107 B.C., serv-



LUCIUS CORNELIUS SULLA

ing with distinction in the Jugurthine War (111-104 B.C.). He then fought in the wars against the Cimbri and the Teutones (104-101 B.C.), becoming a praetor in 93 B.C. and a propraetor in 92 B.C.

Jealous of Sulla's victories and his increasing popularity with the people, Marius, one of Sulla's former commanders, became openly hostile to him, finally succeeding in driving Sulla from Rome in 88 B.C. Sulla, however, marched back into the city at the head of his armies and overthrew the Marian party, proscribing Marius and his followers. Sulla then set sail for Greece, capturing and plundering Athens and expelling the forces of Mithridates from Greece.

Although Marius had died in 86 B.C., the Marian party had again gained ascendancy in Rome, and Sulla was forced to make preparations for a battle on his return to Italy. Enlisting the aid of many Roman nobles and gaining the support of cities in various parts of Italy, he gained an impressive series of victories, finally defeating the younger Marius at Praeneste and conquering the Samnites and Lucanians at the gates of Rome (82 B.C.). He was now master of all Italy.

He appointed himself dictator and set out to make changes in the constitution in order to restore the power to the Senate and the aristocratic class. As a first step he inaugurated a veritable reign of terror to get rid of the Marian party, proscribing many thousands of people. Anyone, even a slave, could, and was encouraged to, kill with impunity anyone who was proscribed. The property of proscribed persons was confiscated by the state, and their children lost some civil rights. Sulla then held a consular election in which he himself

SULLIVAN

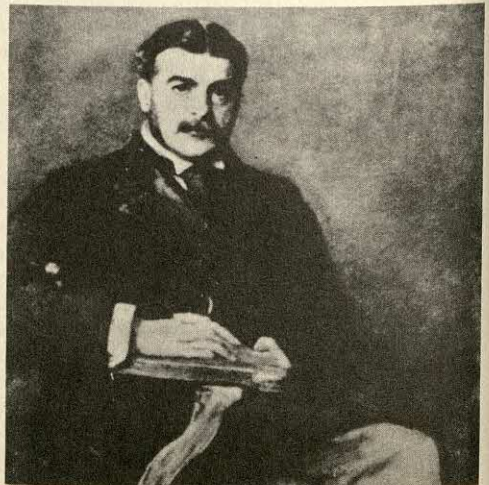
was elected a consul, and proceeded to institute reforms in an orderly fashion. He took away the power of the tribunes of the plebs and set up military colonies all over Italy.

In 79 B.C., having achieved the desired reforms, he resigned the dictatorship. Upon his death he was accorded a public funeral, and a monument was erected to him in the Campus Martius in Rome. He wrote a history of his life and times, entitled "Memorabilia."

Sullivan (*sŭl'i-vən*), SIR ARTHUR SEYMOUR, composer, born in London, England, May 13, 1842; died Nov. 22, 1900. His father was a bandmaster at the training school for British military bands. After studying in his native city, he studied at the Conservatorium in Leipzig for three years. He returned to England in 1861 and prepared music to Shakespeare's "The Tempest," following this with music for other Shakespearean plays, including "The Merchant of Venice," "The Merry Wives of Windsor," and "Henry VIII." Two of his most popular compositions are the hymn "Onward Christian Soldiers" and the song "The Lost Chord." He was principal of music in the Royal Coll. from 1867 to 1881. His greatest successes came, however, of his collaboration with (later Sir) William S. Gilbert (*q.v.*), librettist, with whom he wrote the comic operettas which have insured his fame.

Among their joint productions are "The Pirates of Penzance," "Princess Ida," "The Mikado," "The Gondoliers," "Patience," "Iolanthe," "The Sorcerer," "Ruddigore," and "H.M.S. Pinafore." Sullivan's oratorios and sacred music dramas include "The Prodigal Son," "On Shore and Sea," "The Golden Legend," "The Light of the World," "The Martyr of Antioch," "In Memoriam," and "Te Deum." The queen knighted him in 1883,

ARTHUR S. SULLIVAN



SULLIVAN

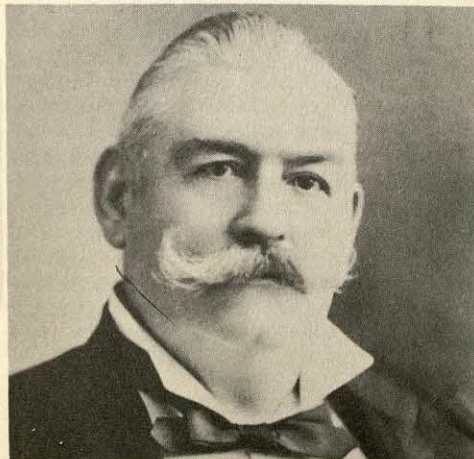
and he was awarded the cross of the Legion of Honor of France in 1878 while officiating at the Paris Exhibition. He was also given degrees by Cambridge and other universities.

Sullivan, JOHN, soldier, born at Berwick, Me., Feb. 18, 1740; died Jan. 23, 1795. He studied and practiced law, but volunteered his services for the American cause in the war of independence. In 1774, he aided in the capture of Portsmouth, N. H., and the following year was made a brigadier general. He commanded the army that invaded Canada in 1776, but, after an unsuccessful attack on Three Rivers, he joined Washington at New York. The same year he was made major general and commanded in the Battle of Long Island and subsequently took part in the battles of Trenton, Princeton, Brandywine, and Germantown. In 1788, he commanded at the siege of Newport, where he was aided by the French fleet, and subsequently fought against the Tories and Indians in New York. He was elected to Congress in 1780, was president of New Hampshire from 1786 to 1789, and later served as U.S. district judge in that state.

Sullivan, JOHN LAWRENCE, American heavyweight pugilist, born in Boston, Mass., Oct. 15, 1858; died in West Abington, Mass., Feb. 2, 1918. Fighting his first major battle at the age of 19, Sullivan became the American boxing champion five years later. Nicknamed the "Boston Strong Boy," he met all contenders in the bare-knuckle boxing field, maintaining his championship for 12 years. His longest fight ended in a draw after 75 rounds. In 1892, fighting with gloves for the first time, he lost the championship to James J. Corbett. His lifetime earnings from boxing and exhibition tours totaled \$1,221,320. He received nothing when he lost the championship to Corbett,

JOHN L. SULLIVAN

Courtesy Brown Bros., N. Y.



MAXIMILIEN, DUKE OF SULLY

since there was a \$25,000 winner-take-all purse, as well as a \$20,000 side bet between the two men.

Following his defeat by Corbett he became an ardent advocate of temperance, retiring to his farm, where he died in 1918.

Sullivan's Island (*sū'l'i-vanz 'ī-land*), an island 6 m. below Charleston, S. C., lying between its harbor and the ocean. It is the site of Ft. Moultrie and is a popular summer resort and residential suburb. Ferryboats connect it with Charleston. Fort Moultrie was evacuated on Dec. 26, 1860, by Major Anderson, commanding Federal forces.

Sully (*sū'l'y*), JAMES, educator, born at Bridgewater, England, Mar. 3, 1842; died Nov. 1, 1923. He studied at Taunton and Regent's Park Coll., London, and took advanced courses in the universities of Berlin and Göttingen. In 1892 he was made professor of philosophy of mind and logic in University Coll., London, where he served for the rest of his life. He ranks as one of England's outstanding psychologists. His works include "Sensation and Intuition," "The Human Mind," "Essay on Laughter," and "The Children's Ways."

Sully (*sū'l'y*, or Fr. *sū-lē'*), MAXIMILIEN DE BÉTHUNE, DUKE OF, Marshal of France, born at Rosny, France, in 1560; died Dec. 22, 1641. He was descended from a distinguished family of wealth and influence, and under the direction of Henry of Navarre received an excellent education and military training. In 1575, he narrowly escaped the St. Bartholomew massacre, and afterward exerted himself with great valor in several important battles. King Henry selected him as counselor of state and finance in 1594, in which capacity he not only reduced taxation, but greatly decreased the national debt, encouraged agriculture, and extended commercial enterprises. He was created Duke of Sully and in 1606 was made a peer of France. He resigned the superintendence of finance shortly after the murder of Henry IV, in 1610. Richelieu recalled him to public service in 1634 and made



Courtesy Metropolitan Museum of Art, N. Y.

MOTHER AND SON

PAINTING BY THOMAS SULLY

him Marshal of France. He wrote several treatises on war and police and published his personal "Memoirs."

Sully (*sŭl'y*), THOMAS, painter, born at Horn-castle, England, June 8, 1783; died Nov. 5, 1872. Taken to America by his parents when he was nine years old, he later studied art under Gilbert Stuart in Boston and Benjamin West in London. Making his home in Philadelphia, Pa., in 1810, he became one of the outstanding early American portrait painters. Among those who sat for his portraits were Thomas Jefferson, Gen. Lafayette, and the actor George Frederick Cooke, in the role of *Richard III*.

On a visit to London (1837), he painted Queen Victoria, in full figure. Although he studied with those American painters who excelled especially in historic scenes, he still shows the heritage of the English 18th century in the sweetness and idealization of his female sitters.

Sully Prudhomme (*sŭ-lĕ' prŭ-dôm'*), RENÉ FRANÇOIS ARMAND, author, born in Paris, France, March 16, 1839; died in Châtenay, France, Sept. 6, 1907. He was educated at Lycée Bonaparte. His first volume of poems was published in 1865 and after that time he devoted his entire life to his writing. Although he wrote much poetry, his two major works are generally considered to be two long philosophical poems, "Justice" (1878) and "Happiness" (1888). After the publication of these works, however, he largely abandoned poetry for philosophy and criticism. His writings in these

SULPHURIC ACID

fields include "Expression in the Fine Arts" (1884); "Reflections on the Art of Verse" (1892); a series of essays on Pascal; "The Psychology of Free Will" (1906); and "The True Religion According to Pascal" (1905), on which he was working at the time of his death. In 1901 he won the first Nobel Prize for literature ever awarded, "in recognition of his exceptional merit as a writer, as shown even in his later years; and especially of his poetry, which reveals a rare genius for the expression of lofty idealism and deep feeling in a perfect form."

Sulphates (*sŭl'fâts*), or SULFATES, the salts of sulfuric acid, some of which occur as native minerals, while others are prepared artificially. The *sulphates of aluminum* are of value commercially and embrace the alums, a class of double salts, formed of aluminum sulphate with the sulphates of ammonia, potash, or soda. *Ammonium sulphate* is made largely from the ammoniacal liquor of gas works, and is employed as a fertilizing agent. *Nickel sulphate* consists of green crystals and is used for nickel-plating. The *sulphate of quinine* is employed in medicine; the *sulphate of zinc*, or *white vitriol*, is used in surgery and in calico printing; and the *sulphate of iron*, or *green vitriol*, is of great value in medicine, for making inks and dyes, and in calico printing. The *sulphate of copper*, or *blue vitriol*, is used in preparing green coloring matters and in surgery. Other important sulphates include those of cobalt, calcium, mercury, silver, and uranium.

Sulphur (*sŭl'fŭr*). See *Sulfur*.

Sulphuretted Hydrogen (*sŭl'fŭ-rĕt-ĕd hĭ-drô-jĕn*), or HYDROGEN SULFIDE, a chemical compound having the formula H_2S , and a characteristic disagreeable odor. Hydrogen sulfide occurs in nature in mineral waters and may also be produced by the decomposition of sulfur-containing organic compounds such as eggs. The substance is produced also during volcanic eruptions. Hydrogen sulfide is heavier than air, moderately soluble in water, and quite poisonous. Its disagreeable odor, however, always indicates its presence. Hydrogen sulfide may be prepared by "burning" sulfur in hydrogen, by heating a mixture of paraffine, asbestos, and sulfur, or by the action of sulfuric acid on ferrous sulfide. The latter method is frequently used in analytical laboratories where hydrogen sulfide is used in testing for metallic ions. Hydrogen sulfide may be burned, giving sulfur dioxide and water, or it may be oxidized in aqueous solution by oxygen, chlorine, or other oxidizing agents. In aqueous solution hydrogen sulfide is a weak dibasic acid, and forms of insoluble sulfides with many water-soluble metallic salts.

Sulphuric Acid (*sŭl'fŭ-rĭk ăs'id*), also known as oil of vitriol, dipping acid, H_2SO_4 ; a heavy, oily liquid, which absorbs moisture rapidly from

materials with which it comes in contact. It is strongly corrosive and will dissolve most metals. It must be handled with care, especially where it is to be mixed with water. If water is poured into it, it reacts so rapidly with the formation of heat that the water is converted into steam and the acid is sprayed around. Sulphuric acid must be added slowly to water, instead of adding water to the pure acid.

It is prepared from sulphur dioxide by catalytic oxidation. Sulphur dioxide is obtained by burning sulphur or pyrites in air, and is further oxidized in the presence of catalysts to sulphur trioxide. Two commercial methods are in use for the production of sulphuric acid. The chamber method consists of passing nitric oxides mixed with sulphur dioxide and some steam into a lead chamber, where the acid slowly condenses on the surface of the chamber and collects at the bottom. This chamber acid usually contains about 60 to 70 per cent sulphuric acid. Chamber acid may be used at this concentration or be further concentrated by evaporating the water with a counter-current stream of hot air, such as that employed in the Gaillard Tower apparatus.

The second commercial method for preparing sulphuric acid is the contact method in which a solid catalyst is used. Sulphur dioxide, mixed with an excess of air, is passed over either platinum black supported on some spongy material, or vanadium oxide in the form of pellets. This produces sulphur trioxide which is absorbed in strong sulphuric acid. The use of water for absorption is not satisfactory because the sulphuric acid forms a very fine fog. Water is added to the sulphuric acid which contains the free sulphur trioxide (called fuming sulphuric acid or oleum) to bring it to any desired strength. When the strength of the acid is above 60 per cent, it does not attack iron at ordinary temperatures.

Pure sulphuric acid, 100 per cent, has a specific gravity of 1.85 at 15° C. and crystallizes at 10.5° C. On heating, it loses sulphur trioxide until the composition is 98.3 per cent.

Its chief uses are in the manufacture of fertilizers, superphosphate and ammonium sulphate, pickling of steel to remove scale, in petroleum refining, in explosives, in electroplating, in chemical manufacture, in photographic processes, in lithography, in process engraving, in pyroxylin plastics, etc. Its commercial use is so universal and so nearly proportional to the degree of business activity that its amount of consumption has been used as a business index.

Sulphur Springs (*sul'fūr springz*), county seat of Hopkins County, Texas, 78 m. E. of Dallas, on the St. Louis Southwestern and the Louisiana & Arkansas Rys. Cotton ginning and grain shipping are major industries. Named for its

sulphur-laden springs, the town was incorporated in 1888. Population, 1950, 8,991.

Sultan (*sul'tān*), a title given to a sovereign or ruler of a Mohammedan state. The wife of a sultan is known as the sultana. This designation is sometimes applied also to the mother, daughter, or sister of a sultan.

Sultan, DANIEL ISOM, army officer, born in Oxford, Miss., Dec. 9, 1885; died in Washington, D.C., Jan. 14, 1947. He was educated at the Univ. of Mississippi and at the U.S. Military Acad., from which he was graduated as a second lieutenant in 1907. He taught civil and military engineering at the academy from 1912-16. After World War I he had charge of numerous engineering projects in the U.S. and spent two years as a member of the Inter-oceanic Canal Board and in command of U.S. troops in Nicaragua. At the outbreak of World War II, he was in charge of Camp Shelby, Miss., and he later served as commander of the 8th Army Corps for one year before being sent to the Far East as deputy commander-in-chief of the China-Burma-India theater in 1943. In the following year, the theater commander, Gen. Joseph W. Stilwell, was recalled and the theater split into two commands. Sultan was named head of the India-Burma section in November 1944, and he remained there until July 1945, when he was appointed Inspector General of the Army.

Sulu Islands (*sōō-lōō'*), or JOLÓ ARCHIPELAGO, an island group of the Philippines, lying between Mindanao and Borneo. The northern coasts are washed by the Sulu, or Mindora, Sea, and its southern, by the Celebes Sea. It includes about 150 islands. All are of volcanic origin. The area is 1,050 sq. m. The chief island is Cagayán Sulu, with a length of 36 m. and a breadth of 12 m. It contains the town of Sulu, or Joló. The archipelago is divided into three divisions, known as the Sulu, Tapul, and Tawi Tawi groups. It has many villages and several seaports.

The soil is generally fertile and the climate is favorable, but the archipelago is subject to hurricanes. Among the productions are rice, tropical fruits, gum mastic, timber, coffee, pearl shells, edible birds' nests, resins, and various minerals. Horses, cattle, goats, and buffaloes are reared in abundance. The inhabitants are mostly of Malay descent and the chief religion is Mohammedan, whose adherents are known as *Moros*. Spain long claimed sovereignty of the islands, but they were ceded, along with the Philippines, to the U.S. in 1898. During World War II, the Sulu Islands were occupied by Japanese forces. On Apr. 11, 1945, American troops recaptured the area. The archipelago became part of the Philippines Republic (*q.v.*) on July 4, 1946, when President Truman signed a proclamation recognizing Philippine independence. Pop., ca. 50,000.

Sulzberger (sŭlz' bĕrg-ĕr), ARTHUR HAYS, newspaper publisher and editor, born in New York City on Sept. 12, 1891. He attended De Witt Clinton and Horace Mann High Schools, and was graduated from Columbia Univ. with the B.S. degree in 1913. After two years in the cotton business, Sulzberger served as a second lieutenant in the army during World War I. He married Iphigene B. Ochs, daughter of Adolph S. Ochs, the owner-publisher of the *New York Times*, and was given a position on the *Times* where he remained for 17 years in various capacities learning the newspaper business. In 1935 Adolph Ochs died, and Sulzberger took charge of the *Times*, retaining in large part the older man's editorial policies. Sulzberger has striven to uphold the motto of the *Times*, "All the news that's fit to print." Conservative and restrained in its editorial policy, the *Times* remains an influential voice in public affairs. Sulzberger is a trustee of the Baron de Hirsch fund and the Rockefeller Foundation, a director of the Jewish Theological Seminary of America, and a member of the Central committee of the American Red Cross.

Sumac (shōō'māk, or sŭ'māk), or SUMACH, a genus of trees and shrubs, which includes about 15 species that are native to North America. About 100 species have been described, most of which are widely distributed, except in the coldest regions. In the *Virginian sumac*, which is found in many sections of North America, the leaves are pinnate and the flowers are small. The wood and bark yield an acrid juice of value in the arts. In most species the flowers are yellowish-green, usually growing in a cluster, and are followed by a group of reddish-colored fruit. In early autumn the leaves assume a scarlet hue and soon fall to the ground. The most widely distributed species is the *smooth-leaved sumac* of the U.S., which grows to a height of 10 or 12 ft. It yields properties of value in tanning and for medicine. The *poison oak* of North America is a shrub from 1 to 4 ft. high, and a closely related species known as *poison ivy* is a vine quite widely distributed. *Swamp sumac*, or *dogwood*, is common to the swamps, where it grows as a shrub to a height of 15 ft. The seeds of this species yield an essential oil used in candle making. The *Venetian sumac* and *elm-leaved sumac* are species native to Europe, where they are utilized largely for tanning, dyeing yellow and black, and in medicine. *Japan sumac* is native to Japan. This varnish is made from the juice, which is obtained by cutting a wound in the tree; on exposure to the air the juice becomes thick and black. A vegetable wax is obtained from the oil of the seeds and is used for candles. Much of the sumac sold in the trade is obtained from Sicily.

Sumatra (sōō-mă'trā), an island of the United States of Indonesia, lying southwest of the Malay Peninsula, from which it is separated by the Straits of Malacca. Sunda Strait separates it from Java, and Banka Strait lies between it and the island of Banka. It is 1,060 m. long and is divided into nearly equal parts by the Equator. The width is 245 m., and the total area is ca. 182,000 sq. m. The Barisan or Chain Mts. are near the western coast, their peaks ranging from 1,500 to 12,000 ft., but the elevations culminate in the volcano Kerintji, height 12,467 ft. Along the western coast is a plain only a few miles in width, which is covered with dense forests and has extensive jungles, while the eastern part of the island is a plain with fertile soil. This plain is traversed by numerous rivers, including the Jambi, Indragiri, Siak, Musi, and Bangka, all of which have a general course toward the east. The eastern shore has a number of important inlets, and off the eastern and western shores are numerous, somewhat fertile islands.

In the interior of Sumatra the climate is hot and because of large marshes tropical diseases are prevalent, but the coast and highland regions are generally healthful. Monsoons and earthquakes frequently occur. There is a heavy rainfall in all months of the year. Among the minerals are limestone, granite, serpentine, basalt, sandstone, saltpeter, coal, copper, lead, iron ore, sulfur, silver, alum, and mineral oils. The flora is very extensive, including many kinds of valuable forest trees, fruits, flowers, grasses, shrubs, and berries. There is also an abundance of wild life, especially the rhinoceros, leopard, elephant, tapir, antelope, tiger, bear, ant-eater, bat, deer, numerous monkeys, and many species of insects. Like Borneo, it is the habitat of the orang-utan, a huge ape. Crocodiles abound in the rivers. Salmon and other fish are abundant. The domestic animals include horses, buffaloes, goats, swine, sheep, and poultry.

The natives of Sumatra belong chiefly to the Malay race and are largely Mohammedans. They are active, intelligent, tall, quite industrious, and differ greatly in customs, language, etc. Polygamy prevails in many sections of the island.

Sumatra trades extensively with Holland and other European countries and with the U.S. The exports include pepper, gold, sappan wood, cotton, precious stones, raw silk, tobacco, sulfur, coffee, camphor, and tropical fruits. Among the chief imports are drugs, rice, textiles, clothing, and utensils.

Sumatra first became known to Europeans through the Portuguese who established trade relations with the island in 1508. About 1600, however, the Portuguese were driven out by the Dutch, who gradually developed various indus-

SUMBA

tries, established their seat of influence at Padang in 1666, and in 1881 acquired full control of the entire island. It is divided into eight districts, known as West Coast, East Coast, Benkulen, Palembang, Lampong, Djambi, Atjeh, and Acheen. The principal seaports include Acheen, or Achin, and Benkulen. During World War II, Japanese invaders captured the valuable oil fields near the town of Palembang on Jan. 17, 1942, and by May of the same year the entire island of Sumatra was in the hands of Japan. In November 1945 British troops recaptured Sumatra. In December 1949 the Dutch granted Sumatra full independence as part of the newly established state of Indonesia (*q.v.*) Population, *ca.* 7,500,000.

Sumba (*sōm'bg*) or SOEMBA, an island of Indonesia, E. of Java, S.E. of Sumbawa (*q.v.*), and S.W. of Flores (*q.v.*). It is about 140 m. long, from 24 to 30 m. wide, and has an area of about 4,300 sq. m. Unlike many others of the Lesser Sunda group, it is sedimentary rather than volcanic. Most of its surface is a plateau of about 2,000 ft. elevation; a few peaks stand out, but none reach more than 4,000 ft. It is less heavily wooded than surrounding islands because it has considerably less rainfall. Most of the inhabitants farm and raise cattle; the horses from this island have long been well known. Besides livestock, the principal products are rice, tobacco, indigo, maize, and cotton. Population, *ca.* 180,000.

Sumbawa (*sōm-bā'wā*) or SOEMBAWA, an island of Indonesia, belonging to the Sunda group of islands, situated between Java and Flores. It is separated from Lombok by Atlas Strait. The length from east to west is 175 m. It has an area of 5,362 sq. m., including neighboring isles. The surface is mountainous and volcanic. Tamboro, 9,354 ft. high, on the northern coast, is an active volcano. A large majority of the inhabitants are Malays who adhere to the Moslem faith. During World War II, Sumbawa was occupied by Japanese forces. Population, *ca.* 315,000.

Sumerians (*sū-mēr'i-qnz*), ancient inhabitants of the region lying between the Tigris and the Euphrates Rivers, corresponding to lower Mesopotamia. The Sumerians were probably the first to develop urban centers of civilization and the city-state type of political organization. About 3000 B.C., they invented the system of writing known as cuneiform (*q.v.*), which was adopted by all their neighbors. Although no longer spoken after 1700 B.C., Sumerian continued to be employed as the scholarly language of the Babylonians for many centuries. Sumerian literature, the oldest sizable group of literary writings known to man, is in the process of translation and restoration by a group of American and European scholars. See also *Babylon*; *Ur*.

Summer (*sūm'ēr*), the warm season of the



MARKET SCENE IN SUMATRA

year, following spring and preceding autumn. It begins with the summer solstice, about June 21, and ends with the autumnal equinox, about Sept. 22. In Canada and the U.S. summer comprises the months of June, July, and August, and in England it includes May, June, and July.

Summerall (*sūm'ēr-əl*), CHARLES PELOT, general, born in Lake City, Fla., March 4, 1867; died in Washington, D.C., May 14, 1955. During World War I he commanded the First Division of the American Expeditionary Forces in France and also the 4th, 5th, and 9th army corps. He was a member (1919) of the interallied commission to negotiate peace in the dispute over the Italian seizure of Fiume. Appointed U.S. Army chief of staff in 1926, he retired in 1930, with the rank of general, and was president of The Citadel, in Charleston, S.C. (1931-53). He wrote "The History of the First Division, A.E.F." (1923).

Summerfield (*sūm'ēr-fēld*), ARTHUR ELLSWORTH, businessman, cabinet member, born in Pinconning, Mich., March 17, 1899. After a grade-school education, he went to work for General Motors Corp. In 1924 he went into business for himself, later becoming a large automobile distributor. He became interested in national politics in 1940 and later devised a highly successful method for financing political campaigns. As a member of the Republican national committee in 1952, he was an early and effective supporter of Gen. Eisenhower. He served as Postmaster General in both Eisenhower administrations.

Summit (*sūm'it*), a city in Union County, New Jersey, 10 m. W. of Newark, on the Delaware, Lackawanna & Western R.R. It is a modern city, supplied with schools, churches, hospitals, and shopping centers. Among its industries are pharmaceutical products, textiles, textile research, plastics, precision parts, pulverizing machinery, and a thriving dairy industry. Chartered

in 1899, it became known as the "Hill City." Population, 1940, 16,165; in 1950, 17,929.

Sumner (*sŭm'nēr*), CHARLES, jurist and statesman, born in Boston, Mass., Jan. 6, 1811; died in Washington, D.C., Mar. 11, 1874. After his graduation from Harvard Univ., he studied law and was admitted to the bar in 1834, taking up his practice in Boston. On July 4, 1845, he delivered his celebrated oration, "The True Grandeur of Nations," which attracted much attention in America and Europe, and soon after that he entered active politics. In 1851, the Democrats and Free Soilers united in electing him U.S. Senator to succeed Daniel Webster, which position he held continuously until his death. He speedily became the chief advocate of the antislavery movement. Among his noted speeches on that subject are those known as "Freedom National, Slavery Sectional" and "The Crime Against Kansas." The last mentioned, in 1857, caused Preston Brooks, a Senator from the South, to make a violent personal assault upon him, the effects of which invalidated him for several years. He was re-elected Senator as a Republican, and as chairman of the Committee on Foreign Affairs was a valuable friend and adviser of President Lincoln.

Sumner opposed President Johnson and the treaty with Santo Domingo, but favored the purchase of Alaska. His opposition to the Santo Domingo treaty, in 1871, lost him the support of President Grant and the Republican Senators, as well as the chairmanship of the Committee on Foreign Affairs. His closing effort in public life was the introduction of a bill in the Senate having for its object the protection of the civil rights of colored citizens. Sumner was editor of the *American Jurist*, lectured at Harvard, and edited

three volumes of law decisions. His public addresses and orations were published in 15 volumes, edited partly by himself and partly by Longfellow, who was his literary executor.

Sumner, EDWIN VOSE, soldier, born in Boston, Mass., Jan. 30, 1797; died Mar. 21, 1863. He studied at Milton Acad. and in 1819 became a second lieutenant in the U.S. Army. Until 1838 he served on the frontier, but in that year took charge of the school of cavalry at Carlisle, Pa. He served as major during the Mexican War, taking part at Cerro Gordo and Molino del Rey, and in 1851 became governor of New Mexico. Subsequently he saw service against the Indians and in 1861 was assigned to the Army of the Potomac, with which he served at Fair Oaks, Antietam, and Fredericksburg. In 1863, he was assigned to the department of Missouri, but died before assuming duties in the West.

Sumner, JAMES BATCHELLER, biochemist, born in Canton, Mass., Nov. 19, 1887; died in Buffalo, N.Y., Aug. 12, 1955. He studied at Harvard Univ., where he received the doctorate in 1914, and at the Univ. of Brussels. After teaching at Mt. Allison Coll., N.B., Canada, and the Worcester (Mass.) Polytechnic Inst., he became (1914) professor of biochemistry at Cornell Univ., where he taught until his death. Noted for his research in enzymes, he shared the 1946 Nobel Prize in chemistry with J. H. Northrop and W. M. Stanley, for isolating crystalline forms of enzymes and viruses. Sumner's publications include "Chemistry and Methods of Enzymes" (1943).

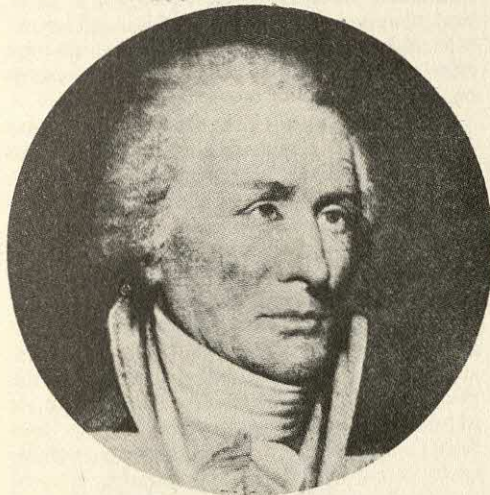
Sumptuary Laws (*sŭmp'tŭ-ā-rĭ lāz*), the name of statutes that aim to regulate private expenditures, such as extravagance in the purchase and use of clothing. Laws of this kind were deemed essential in ancient Greece and Rome, where legislation was directed with the view of avoiding extravagance in dress, entertainments, and even funerals. The purpose of such laws was not solely to prevent extravagance, but likewise to overcome crime, poverty, and immorality. Costly banquets and funerals were prohibited by the laws of Solon and the early laws of Rome limited the expenditures and specified the number of guests that might be entertained at banquets. In England, during the reign of Edward III, the kinds of clothing that might be worn by certain classes were prescribed and not more than two courses were permitted at a meal. In colonial times, Massachusetts undertook to regulate the cost of funerals. At present the tendency of government is to guarantee personal liberty, leaving it to the individual as to the habits, occupation, food, drink, and clothing that he may see fit to adopt. However, legislation is directed toward the protection of public health and public safety. Prohibition of the liquor traffic is a form of sumptuary legislation.

CHARLES SUMNER



Sumter (*sūm'tēr*), county seat of Sumter County, South Carolina, 43 m. E. of Columbia, on the Seaboard Air Line and Atlantic Coast Line R.R.'s. The surrounding country is fertile, producing cotton, tobacco, corn, oats, wheat, peanuts, vegetables, and fruits. Livestock is raised extensively. It is a lumber center, and has a number of industrial plants producing furniture, spreads, caskets, fiber cans, aluminum awnings, venetian blinds, sash and doors, hosiery and coffee. Morris Coll. for Negroes is located in the town. Sumter was founded in 1799 and incorporated in 1833. Population, 1950, 20,185.

Sumter, THOMAS, soldier, born in Virginia in 1734; died June 1, 1832. His early life was spent in South Carolina, where he took part in the Cherokee War. In 1776 he was made lieutenant colonel in the Continental Army, serving in his state until the fall of Charleston, when he raised a



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large force in North Carolina, with which he defeated the British in 1780. The same year he gained a victory at Hanging Rock, but was routed by Tarleton at Fishing Creek. He later won a numerical but indecisive victory over Tarleton at Blackstock Hill, where he was severely wounded; he return to active service in 1781. He was elected to Congress in 1788 and at two succeeding elections, was elected to the U.S. Senate in 1801 and 1811, and from 1809-11 he was U.S. minister to Brazil. He was the last surviving general officer of the Revolutionary War.

Sun (*sūn*), the central body of the solar system (*q.v.*), around which all planets, asteroids, and comets gravitate. The sun is a star, not very different from the many stars that are visible at night and is so much brighter only because we happen to be situated near to it, compared with stellar distances. Its mean distance is

93,000,000 m. This figure varies by about 3 per cent in the course of the year because the earth's orbit is not exactly circular. The sun's diameter is 864,000 m., or 109 times as large as that of the earth. The mass is 332,000 times as great. Although in a gaseous condition, the sun has a density nearly one and one-half times that of water.

The physical nature of the sun has been revealed by analyzing its light with the spectroscope. Most of the chemical elements known on the earth have been identified in the sun. Among the elements not recognized are those of the higher atomic weights, which are probably too heavy to rise into the outer regions of the sun. In the atmosphere of the sun four different regions are distinguished, the lowest, deepest visible layer is the light-sphere or *photosphere*, which constitutes the brilliant surface of the sun; its temperature is nearly 6,000° C. and its pressure only one one-hundredth that of the earth's atmosphere. Directly above the photosphere is the *reversing layer*, less than 200 m. in thickness and so called because it changes the emission lines from the photosphere into dark Fraunhofer lines in accordance with Kirchhoff's law in physics. This layer is the base of a much more extensive region known as the *chromosphere*, which appears with a reddish light at the time of a total eclipse of the sun. The outermost envelope is of very low density; this is the *corona* which is best visible at the time of totality during a solar eclipse, when it is seen as a crown extending far above the surface of the sun.

The photosphere, examined under favorable conditions, appears not as a uniform surface but shows a granular structure. These *granulations* change very rapidly and are due to streams of hot materials rising from the interior, which is at a very much higher temperature than the surface. Specially bright areas called *faculae* can often be seen near the limb of the sun where the intensity of the photosphere is reduced by absorption through a longer path of gaseous material. The most striking feature of the sun's disk is the presence of *spots* which often come in groups and may reach such a size that they can be seen with the naked eye protected by a dark glass. They look black by contrast with the surrounding sections but are actually only slightly fainter than these. Some last only a few days while others can be followed for weeks. They cross the sun's disk in about 13 days indicating that the sun rotates in about 25 days around an axis tipped by seven degrees from the normal to the earth's orbit. The rotation is somewhat faster near the solar equator and slower in higher latitudes. There appears a cycle of 11 years in the frequency of the sun-spots; at minimum, weeks may go by without spots of an appreciable size, while at maximum,

several large spots sometimes occur simultaneously. At the time of a total eclipse of the sun we frequently see rose-colored clouds rising from the chromosphere; these so-called *prominences* can be studied at any time without an eclipse by means of a special type of spectroscope. They show the gases, mostly hydrogen, in the solar atmosphere in violent turmoil and have been successfully recorded by moving pictures.

There has been much speculation concerning the source of the sun's energy and its apparently unchanging rate of radiation. According to the most recent conception, the energy is released from the gradual atomic transformation of hydrogen into helium.

All forms of life on the earth would stop if the light and the heat of the sun ceased to reach us. Our existence therefore depends entirely on the sun's beneficial radiation, and it is not surprising that primitive people worshiped the sun as the supreme deity. Many investigators have tried to discover relations between solar phenomena and various terrestrial events. One that is well established is the correspondence between the frequency of sunspots and the magnetic activity of the earth, as shown by auroral and magnetic disturbances. Also a direct connection between radio fade-outs and the presence of active regions on the sun's surface has been recognized. But correlations with the size of crops, the appearance of epidemics, the business cycle, and other episodes in human affairs remain extremely dubious.

Sunbird (*sūn'bērd*), one of a group of tropical and semi-tropical birds with resplendent plumage found chiefly in the East Indies, southern China, and across India. They constitute the family *Nectariniidae*, so named from their habit of drinking the nectar of flowers. (Unlike hummingbirds they seldom poise themselves in the air to do this.) They feed also on small insects, are entirely arboreal in habit, live singly or in pairs, and build elaborate hanging nests in which they lay two eggs. The young birds of both sexes resemble the female until the first autumn moult. Sunbirds are somewhat larger than hummingbirds but rival them with brilliant metallic gold, red, green, and purple feathers. During the breeding season the males have a short but pleasing song.

Sunburn (*sūn'bārn*), in medicine, an inflammation of the skin caused by overexposure to the sun. See *First Aid*; *Sunstroke*.

Sunbury (*sūn'bēr-i*), a city in east central Pennsylvania, seat of Northumberland County, on the Susquehanna River. It is 54 m. N. of Harrisburg and served by the Pennsylvania and Reading R.R.'s. Primarily an industrial community, Sunbury manufactures textiles, metal products, building materials, wire rope, men's hats, and a number of other products. The surround-

ing area is general farming country. The location was the site of an Indian village, and Ft. Augusta (now a museum) was built in the vicinity in 1756. Sunbury was laid out in 1772, incorporated as a borough in 1797, and as a city in 1921. Thomas Edison built (1883) one of his earliest incandescent lighting plants in Sunbury. Population, 1940, 15,462; in 1950, 15,570; and in 1960, 13,687.

Sunda Islands (*sūn'dà 'īlandz*), a chain of islands in the Malay Archipelago, situated between the China Sea and the Indian Ocean. They are divided into the two groups known as the Lesser Sunda and the Greater Sunda Islands. The former includes Bali, Flores, Lombok, Timor, Sumbawa (*qq.v.*), and a number of others, while the latter embraces Borneo, Celebes, Java, the Moluccas, and Sumatra (*qq.v.*). These islands are so named from the Sundanese, a race of Malaysians, who somewhat resemble the Japanese. All the islands, except a part of Borneo, belonged to the Netherlands East Indies until 1950 when they became a part of the new independent state of Indonesia (*q.v.*).

Sun Dance (*sūn dāns*), an annual religious ceremony practiced by many tribes of the American Indians, as a thanksgiving to the sun god. Formerly the ceremony was accompanied by long fasting and tortures, but these extremes are no longer permitted, although the sun dance still survives among the Sioux, Cheyenne, and other tribes. Certain priests and warriors lead the ceremonies, which continue for about a week, but the dance proper is conducted only about four days and nights. A period of fasting usually precedes the dance, and those who take an active part are partly stripped and painted. The dancers take their position in a half circle about a pole at the center, at the top of which is a sacred object, and they constantly look upward so as to face the sun. They hold between their teeth whistles which produce a shrill sound, and the songs of the sun dance are chanted to the beating of a powerful drum.

Sunday (*sūn'dī*), the first day of the week, kept as the sabbath among most Christians in remembrance of the resurrection of Christ. Laws for the observance of Sunday were enacted as soon as the Christian religion was recognized, and Constantine, in 321, prohibited all business on that day, except necessary agricultural labor and the manumission of slaves.

Sunday, WILLIAM ASHLEY ("BILLY"), evangelist, born in Ames, Iowa, Nov. 18, 1862 (or Nov. 19, 1863); died in Winona Lake, Ind. (or in Chicago, Ill.), Nov. 6, 1935. He was of Pennsylvania German descent and was soon placed in an orphanage because of his father's death shortly after his birth. In 1876 he went to Nevada, Iowa, to work and to attend high school. He later

went to nearby Marshalltown, where he began to play baseball. He played for the Chicago White Sox, 1883-88, and until 1891 for Pennsylvania teams. In 1887 he became converted and after his baseball career became an assistant to an evangelist. He was licensed to preach in 1898 and ordained by the Chicago Presbytery in 1903. He preached to as many as 10,000 persons at a time, and his meetings were noted for his accompanying musicians and choirs. Some 300,000 persons were said to have been converted by him, and he also had a strong influence in preparing the U.S. for prohibition during his peak years between 1910 and 1920.

Sunday Schools (*sūn'dī shkoolz*), often called Church Schools, organizations maintained to give instruction in religion and Christian living to the children, young people, and adults of a church. Churches observing Saturday as their weekly holy day hold the schools on Saturday, calling them Sabbath schools; some other denominations call them Sabbath schools even though they meet on the first day of the week. The term "church school" has also come into use to take account of the week-long program going on in many denominations with activities scheduled through the week. Protestant denominations commonly hold their Sunday school just before or after regular services on Sunday. The ancient patriarchs conducted family religious instruction, and with the rise of Christianity, religious teachings were given alike to old and young. Religious instruction of the young was neglected in the Middle Ages, but with the Reformation systematic Sunday schools arose.

Just who founded the modern Sunday-school movement is not clear. Martin Luther organized Sunday schools during the times of the German Reformation. Entire schools were frequently made up of adults, who attended them to read and study the Bible, and many of the schools necessarily taught the rudiments of reading to permit religious instruction and memorizing of the Scriptures. John Wesley conducted children's schools during his early missionary days in Georgia. Robert Raikes (*q.v.*), publisher of the *Gloucester Journal*, is considered the father of the modern Sunday school. In 1781 he formed several local organizations in the poorer districts of his city, largely with the view of overcoming widespread profanation of the Sabbath. These children were employed during the week in factories, and on the Sabbath spent their time in idleness and mischief. Teachers were at first employed for 25 cents a day and the children were kept in the Sunday school the entire day, except for the brief period they attended church services.

The idea spread rapidly and brought forward many volunteer teachers. In 1784 Raikes published an article in the *Gentleman's Magazine*, minutely

describing the organization and objects of the Sabbath school. Rowland Hill in the same year established the first Sunday school in London, and soon Sunday schools could be found all over Great Britain. The Philadelphia Society for the Support of Sunday Schools was organized in 1786. Schools were soon started in Boston, New York, and other cities. The New York Sunday School Union was organized in 1816, and the American Sunday School Union in 1824. At present all the stronger Protestant churches have Sunday-school organizations.

The Roman Catholic churches give religious instruction to the young either in Sunday schools or in parochial schools maintained largely for the same purpose. Because Catholic parochial schools do not have a place for all the children, the Confraternity of Christian Doctrine has a special afternoon program for children who attend public grammar schools and an evening program for those attending high school. Because great numbers of people come to Mass on Sundays, necessitating the use of the entire seating capacity five separate times, religious instruction in cities is given more often during the week. More than 200,000 persons, including priests, brothers, sisters, and lay people, are engaged in giving these instructions.

The more highly organized Sunday schools have graded instruction, trained instructors, and textbooks. In North America there are various officially established agencies to promote and direct Sunday-school work on an interdenominational basis. The Division of Christian Education of the National Council of the Churches of Christ in the U.S.A. has a membership of 44 denominational bodies. Some of these are Eastern Orthodox; the majority are Protestant. In addition, there are various state and county councils of churches; many of these have departments of Christian education as an integral part of the total organization.

In spite of its origin outside the church, the Sunday school, as it has developed, is now usually thought of as an integral part of church work. Funds are derived from the general church budget.

In 1959 the Division of Christian Education of the National Council of Churches estimated that there were enrolled in Sunday schools of the U.S. a total of 39,963,056 persons.

For the special needs of the Eastern Orthodox churches in the U.S., there was started in 1955 the Orthodox Christian Education Commission. In 1960 the Standing Bishops' Conference recognized the commission as its own. Its first working conference was held in 1961. The scope of its concern embraces much which, within the Protestant communions, is cared for through work of the Sunday schools.

The World Council of Christian Education and Sunday School Assn. is a federation which links 62 cooperative bodies around the world in the interests of work of the Sunday schools in particular, and Christian education in general. One of its constituent units is the Division of Christian Education of the National Council of Churches. While its constituency is chiefly Protestant, there are places also where, in the cooperative bodies, the Orthodox churches are represented.

Originating as a lay movement, the Sunday school has come to be regarded as an official church agency rather than as an independent or semi-independent institution, and as one of the chief instruments through which the Church discharges its educational responsibility. Much thought is being given to ways in which work attempted through Sunday schools can be made more a part of the total life of the church as such.

Synagogues maintain daily classes in the instruction of Hebrew, but many Jewish temples also have Sabbath classes for the children, to teach other subjects, such as Hebrew history, culture, literature, and so forth.

Sunderland (*sūn'dēr-land*), a seaport city in northern England, seat of a county borough which includes Bishopwearmouth, Monkwearmouth, and Southwick. It is at the mouth of the Wear River and on the North Sea, 14 m. N.E. of Durham. Sunderland has large shipbuilding interests, going back at least to the 14th century. The manufactures include marine engines, paper, chemicals, furniture, pottery, and telephone and electric equipment. Coal mining and fisheries are important. Sunderland is the seat of three colleges. It is an old town and was often referred to as Wearmouth by the Saxons; St. Peter's

church at Monkwearmouth retains parts of a monastery built in 674. Because of its very extensive ship construction facilities, it was a frequent target of the German air force in World War II and was heavily damaged. Population, 1961, 189,629.

Sundew (*sūn'dū*), a genus of plants native to America, found chiefly in bogs and marshes. The common sundew has rounded leaves that spring from the root, forming a rosette, and in the center is a tall stem with a raceme of flowers on one side of the upper part. The leaves are fringed and covered with hairs, which secrete a sticky fluid. When small insects come in contact with the hairs, they are caught and held firmly by the enfolding hairs, and are digested through the action of the secretion.

Sundial (*sūn'dī-əl*), a device for telling the time by the sun. The ordinary garden sundial consists of a dial plate, on which are inscribed hour lines, and a triangular gnomon, or standing metal piece, which is sometimes also called the style. One tells the time by observing where on the dial the shadow made by the gnomon falls. In essence, one measures the angle the sun makes with the local meridian, which is constant at a given hour at a given place. A sundial must be designed for the place where it is to be used; in order to provide accurate determination of time, the gnomon must be set parallel to the axis of the earth.

Sunfish (*sūn'fish*), a genus of marine fishes of the family *Diodontidae*. They are so called from the compressed form of the body and because of their habit of coming to the surface when the sun shines. The body is short and of a circular form, terminating in a short and abrupt tail. They have two large fins, a dorsal and an anal, by which they move through the water in a vertical position. In some instances they effect movement by rolling the body over and over. Only two species are known, the short sunfish and the oblong. The *short sunfish* is quite round when young, but its body gradually assumes a compressed form and attains a length of 3 to 7 ft. The *oblong sunfish* is somewhat larger, its body attaining a diameter of from 8 to 12 ft. These species occur in all the seas. The sunfishes have a leathery skin and soft, white flesh. An oil useful in medicine is secured from the liver. Sunfishes have no swimming bladder or teeth, cutting edges of bone serving instead of the latter. The name is sometimes applied to several species of small, flat fishes common to streams and lakes.

Sunflower (*sūn'flou-ēr*), a plant of the aster family (genus *Helianthus*), which has large cordate leaves and terminal, flat, yellow flowers. There are ca. 100 species, of annual and perennial varieties; all are grown as ornamental plants

SUNFISH

Courtesy Belgian Information Center, N. Y.



THE EVOLUTION OF LAND TRAVEL



EGYPTIAN CHARIOT



ANCIENT GREEK CHARIOT



ELEPHANT AND
CANOPIED HOWDAH
INDIA



ENGLISH COACH
ca. 1800



SEDAN CHAIR, 18th CENTURY



ELIZABETHAN COACH



COVERED WAGON



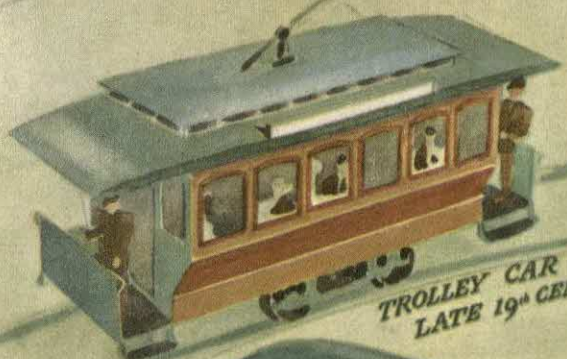
JAPANESE
JINRICKISHA



RUSSIAN
TROIKA



BICYCLE ("THE ORDINARY") ca. 1870



TROLLEY CAR
LATE 19th CENTURY



FIRST FORD
AUTOMOBILE, 1896



MODERN OVERLAND BUS

FROM STAGECOACH TO STREAMLINER



STAGE COACH, 18th CENTURY



ROCKET, 1829



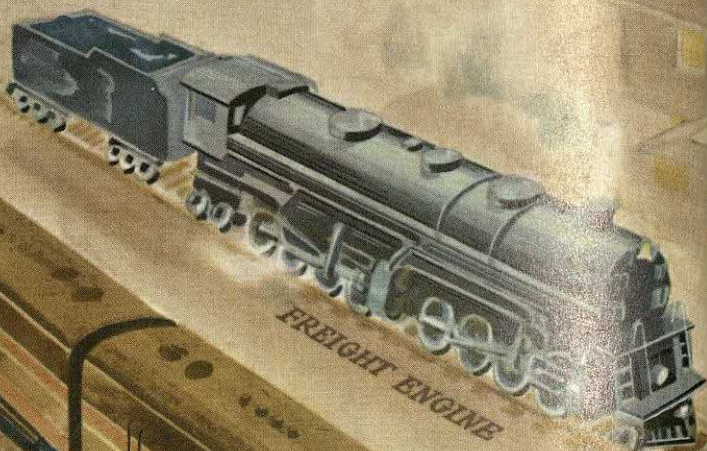
DE WITT CLINTON, 1831



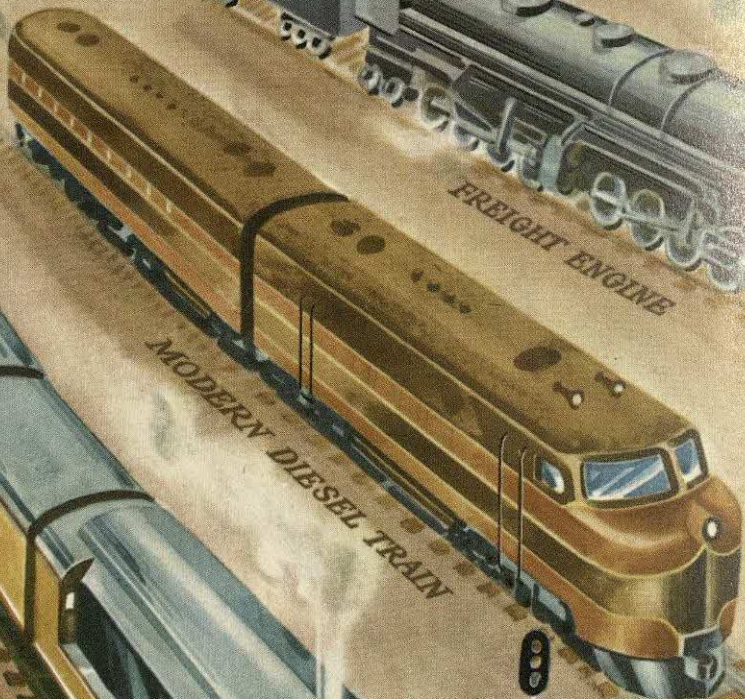
INTERURBAN ELECTRIC LOCOMOTIVE



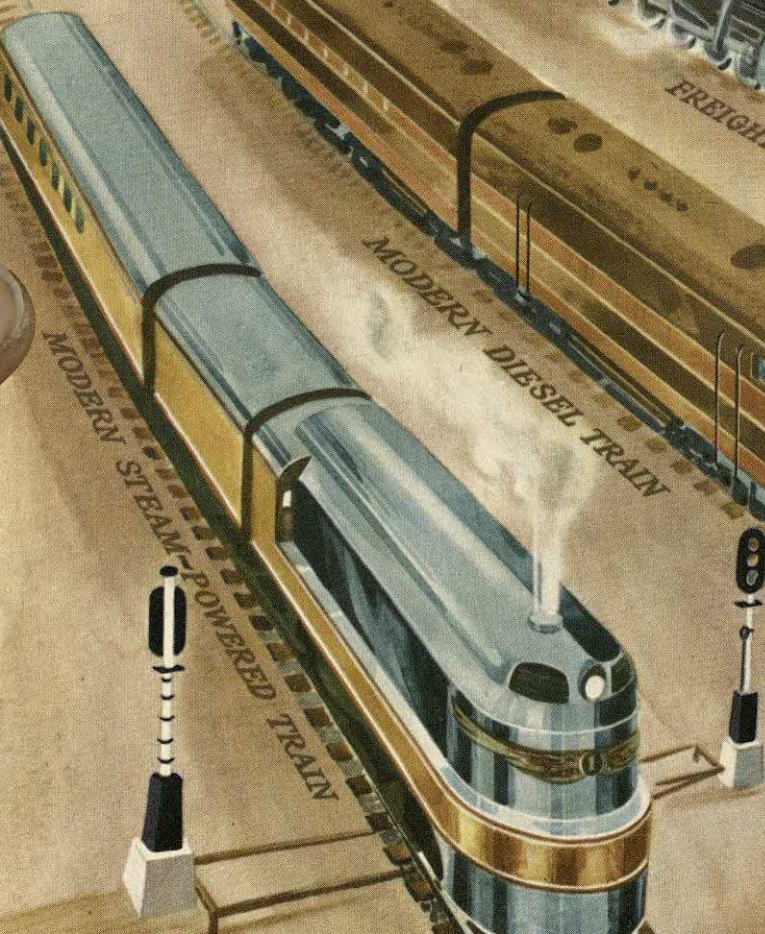
EMPIRE STATE EXPRESS, 1893



FREIGHT ENGINE



MODERN DIESEL TRAIN



MODERN STEAM-POWERED TRAIN

except one, the *girasole* or *Jerusalem artichoke*, which yields an edible tuber much used as food. The various species grow to heights of as much as 15 ft., the common sunflower ranging from 3 ft. to 12 ft. The flower is from 3 in. to 6 in. in the wild state and up to 14 in. in cultivated plants. The largest flowers are obtained by pruning subsidiary buds. The sunflower is native to North America. Its seed is valuable as food for cage birds and poultry and is popular as a tidbit for human consumption; it also yields sunflower oil (*q.v.*). The leaves are sometimes used as fodder for livestock. The flower is an excellent producer of honey. The common sunflower is widely grown commercially in southern Europe, and particularly in the U.S.S.R. The plant is named for the flower's resemblance to the sun. It is the state flower of Kansas and the floral emblem of Peru.

Sunflower Oil, an oil obtained from the seed of the sunflower plant. For table or cooking use it somewhat resembles olive oil. It is important commercially as a drying oil in the manufacture of paint and varnish (see *Oils*). Sunflower oil is produced by compression of the seed. The oilcake by-product is used as feed for livestock and poultry.

Sunflower State, nickname for the State of Kansas.

Sunnites (*sūn'its*), the orthodox sect of Moslems, so called from their adherence to the *Sunna*, the traditional prophetic laws. See *Islam*.

Sun Rose (*sūn rōz*), a plant (genus *Helianthemum*) of the rockrose family. It is an ornamental shrub, which bears flowers of various colors. The plant is native to Europe and Asia.

Sunshine State (*sūn'shīn stāt*), nickname for the State of South Dakota.

Sunstone (*sūn'stōn*), a brilliant, gold-flecked mineral. See *Felspar*.

Sunstroke (*sūn'strōk*), or HEATSTROKE, a dangerous affection of the nervous system, caused by exposure to the direct rays of the sun or to high heat combined with high humidity, especially in the tropics and in the hottest part of the year in the temperate zones. It is quite common in industrial plants and during outdoor activities. Early symptoms are faintness, increased body temperature, thirst, dryness of the skin, and prostration. Later the heart action becomes violent, and the temperature rises considerably. This condition is sometimes followed by vomiting. Consciousness may be lost, and finally coma might result. Prompt treatment is essential. Ice packs and cold sprays may be used until the body temperature is reduced to 102°; then cold sponges are recommended. Medical advice should be obtained, as complications of the respiratory and circulatory systems have been encountered in cases of sunstroke.

Heatstroke should be differentiated from *heat exhaustion*, with which it is often confused. Heat exhaustion is characterized by dizziness, pronounced weakness, pallor, stupor, profuse perspiration (the victim of sunstroke does *not* perspire), rapid pulse, and rapid breathing. The blood pressure is lowered. There is rarely loss of consciousness. There may be cramping pains in the muscles of the abdomen and extremities. The temperature may be subnormal or slightly elevated. Usually heat exhaustion may be relieved by rest in a cool place. More severe cases require stimulants such as coffee or strong tea, and the administration of fluids containing salt, soda, and sugar. Sometimes the physician may find it necessary to administer intravenous injections of fluids.

For those whose work requires constant exposure to high temperatures, increased fluid intake with increased salt intake in food or as salt tablets is valuable in preventing heat stroke, heat exhaustion, or heat cramps. Many industries provide salt-tablet dispensers at drinking fountains for the protection of the workers.

Sun Valley (*sūn vāl'i*), an all-season resort in Central Idaho, near Ketchum, approximately 80 m. E. of Boise. It is noted for its scenic beauty, skiing facilities, hunting and fishing grounds, inns and chalets. During World War II the U.S. Navy used Sun Valley as a rehabilitation center. Population, *ca.* 300.



Courtesy Union Pacific Railroad

WINTER IN SUN VALLEY

One of the attractions of the resort is the possibility of swimming right after skiing



Sun Worship (*sūn wár'shīp*), a form of nature worship which dates from remote antiquity. It was practiced throughout the period of human history to a considerable extent among peoples somewhat higher in the scale of civilization than the nomadic tribes. In this form of religious worship the sun and moon are regarded as companions, sometimes as brother and sister or husband and wife, and they are held to be the rulers of the earth. It was the chief worship among the Caucasian tribes, from whom it descended to certain classes of Brahmins, and is still practiced in some parts of India. The ancient Persians connected their god Mithra with the sun, as also did the Greeks their Helios and the Egyptians their Ra. The Spanish conquerors of Mexico found a people who maintained splendid temples dedicated to the sun, among whom the priests of the sun were the predominating influence. Sun worship flourished in Peru and to some extent among the Indians of North America. The Peruvians held the sun to be the ancestor and founder of the dynasty of the Incas, who made sun worship the state religion and reigned as the representatives of the sun god.

Sun Yat-sen (*sōn yāt-sēn*), statesman, *Father of the Chinese Republic*, also known as *Dr. Sun* and *Sun Wen*; born near the island of Macao, *ca.* 1866; died in 1925. An advocate of Western culture and of Christianity, he was the first graduate of the new Coll. of Medicine at Hong Kong, China (1894), and aligned himself with a secret revolutionary society active in 1895. Forced to flee, Dr. Sun traveled to several foreign countries always planning China's reform and enlisting support for a revolution (1895-1911). From England he was influential in engineering the almost peaceful revolution in 1911, when the Manchu dynasty was overthrown and Kuomintang

(Republican party government of South China) was established. Returning to his native country in 1912, he was elected provisional president of the new Chinese Republic and but a few months later retired in favor of Yuan Shihkai. However, he became president of the Southern Chinese Republic in 1921. A serious breach with his commander-in-chief, Ch'en Ch'ung-ming, drove Dr. Sun from his native province to seek refuge, this time in Shanghai. He later defeated Gen. Ch'en and returned to power in Canton in 1923. From that time until his death in 1925 during a leader's conference at Peking, he was the chief executive of the Canton government. His principles of Nationalism, Democracy, and Socialism won him the enthusiastic support of the workers and the students. In 1929 his remains were transferred to the city of Nanking, where an imposing mausoleum was erected in his honor. See also *China*.

Superior (*sū-pēr'i-ēr*), county seat of Douglas County, Wisconsin, on Lake Superior, 7 m. s. of Duluth, Minn. Communication is furnished by the Northern Pacific, the Chicago & North Western, the Great Northern, the Duluth, South Shore & Atlantic, and other railroads. It has an airport. It is situated at the mouth of the St. Louis River, on three bays or inlets of Lake Superior, and has a well-sheltered harbor. It manufactures lumber, brick, ironware, furniture, gas engines, mattresses, machinery, and farm implements. The trade in coal, lumber, steel, wheat, and merchandise is extensive, as the city has abundant facilities to handle large quantities of these commodities. It has large flour mills, and wharves.

Superior is in the famous Northern Woods vacation area, and in the vicinity are Pattison State Park and Manitou Falls. The city has a state teachers college. The vicinity was visited by Du l'Hut, in 1680, when he established a trading post here, but the town was not laid out until 1854. In 1881 the Northern Pacific R.R. reached Superior, and in 1889 the city was incorporated. Population, 1940, 35,136; in 1950, 35,325.

Superior, LAKE, the most westerly of the Great Lakes of North America, the largest body of fresh water in the world. It is bounded on the N. and E. by Ontario, on the W. by Minnesota, and on the S. by Michigan and Wisconsin. The lake is *ca.* 350 m. long and 31,820 sq. m. in area. Its elevation is 602 ft. above sea level and its greatest depth is 1,290 ft. It has *ca.* 1,760 m. of coast line, the principal inlets in the U.S. being Whitefish, Keweenaw, and Chequamegon bays, and in Canada Thunder Bay and Michipicoten Harbor. Lake Superior receives the drainage of a region covering only about 85,000 sq. m., because of its location near the extensive

SUN YAT-SEN



watershed between the Mississippi River and Hudson Bay. Many small streams flow into it, the most important being the St. Louis, Pigeon, Nipigon, and Fire Steel rivers. The lake's boundaries enclose many islands and island groups, including the Apostle Islands, Isle Royale, Manitou, and Grand, under U.S. jurisdiction, and Caribou and Michipicoten, under that of Canada. Keweenaw Point, at the tip of Keweenaw Peninsula, is the most important projection into the lake. The peninsula comprises Keweenaw County, and a part of Houghton County, in the State of Michigan. The lake's southern shore is generally low and sandy, but with a number of remarkable cliffs, among them Pictured Rocks, 300 ft. high. The northern shore is formed largely of cliffs ranging from 300 to 1,500 ft. above the lake. A line drawn from St. Marys River to a point north of Isle Royale, and thence to the mouth of the Pigeon River, constitutes the boundary between the U.S. and Canada. Lake Superior has valuable sturgeon, trout, whitefish, and other fisheries. Copper and iron deposits of great value abound on its shores, and on many of the islands, especially in the vicinity of Duluth, Superior, Houghton, and Port Arthur. It is important as a route of trade and travel, being the final link in the Great Lakes seaway to the Atlantic Ocean (see *St. Lawrence Seaway and Power Project*). The St. Marys River at the southeast end, its only outlet, connects Lake Superior with Lake Huron.

Supernaturalism (*sū-pēr-nā'ūr-āl-iz'm*), a term in theology characterizing the belief that certain religious facts can never be explained by mere reason or by logical application of natural laws. This whole concept goes back to St. Augustine (354-430) and therefore permeates as a basic idea all Catholic theology. The problem of supernaturalism *vs.* rationalism (*q.v.*) also entered into the original Protestant dogmatic theology. The original Reformers believed firmly that reason could decide only problems and questions of this world, never spiritual values and facts. This belief was frequently reaffirmed in the 18th and 19th centuries when the Protestant churches opposed the contentions of a newly awakened rationalism. The controversy against supernaturalism was brought on by theologians and representatives of philosophy alike. However, the Pietists and the Moravians (*q.v.*) and later Wesley and Whitefield (*qq.v.*) and most Protestant theologians reaffirmed the position that the main contents of Christian religion, although surely not contradicting reason, cannot be conceived by mere logical thinking, but must be supplemented by religious experience, and that prophecies and miracles prove the truth of the Christian faith. Not all of the Protestant supernaturalists (especially not those of the 19th cen-

tury) added that the Bible is divinely inspired and therefore infallible in every way. Actually, the antithesis between rationalism and supernaturalism goes back to the fact that logically the rationalists, with their belief in the all-comprehensiveness of reason and thinking, must believe in the oneness of all reality, while the supernaturalists believe that the very nature of God is so entirely different from everything which is of this world that reason is not enough to understand it. In the 19th century, both sides conceded that the question does not *per se* entail any criticism of the authority of the Bible. The transcendental nature of God was also emphasized by men like Kierkegaard (*q.v.*) and many other theologians, the best known of whom were Adolf Harnack and Karl Barth. These men approach the problem of supernaturalism in accordance, although not in complete agreement, with historical Protestantism. Cardinal Newman discussed the same problem from the Catholic point of view.

Superposition (*sū-pēr-pō-zīsh'ūn*), or **SUPERIMPOSITION**, one of the postulates of Euclid's geometry which states that any figure may be moved without altering its size or shape. In geometrical proofs it is frequently used to prove congruencies; one figure is considered to be picked up and the known equal parts made to coincide with corresponding parts of another figure. The figures are said to be superposed. In optics the superposition principle is used to find the effect of two light waves which act simultaneously at a given point.

Supersonic Vibrations (*sū-pēr-sōn'ik vī-brā'shūnz*). See *Sound*.

Suprarenals (*sū-prā-rē'nālz*), in anatomy, small glands located above the kidneys; the function of these glands is not yet fully known. Each gland is subdivided into two parts, *cortex* and *medulla*, the latter producing adrenalin (*q.v.*).

Supreme Court (*sū-prēm' kōrt*), *u.s.*, the only permanent judicial institution established by the Constitution, and highest court in the U.S. It has both original and appellate jurisdiction as fixed in Art. III; Sec. 2. The function of the court is, as expressed by Chief Justice Fred M. Vinson, to resolve conflicts of opinion on Federal questions that have arisen among lower courts, to pass upon questions of wide import under the Constitution, laws, and treaties of the U.S., and to exercise supervisory power over lower Federal courts. Justices are appointed by the President with consent of the Senate; Congress has set their number at one Chief Justice and eight Associate Justices. See also *Courts*; *Federal Courts*; *United States*; **CONSTITUTION OF**.

Surabaya (*sōō-rū-bā'yā*), or **SOERABAYA**, one of the principal seaports and most important naval station of Indonesia, on the strait of

Madura, near the mouth of the Mas River. It is the largest city in East Java, and an important trading center. The surrounding country is fertile, producing fruits, sugar cane, cereals, and spices. Manufactures include tobacco and cigars, furniture, clothing, sugar, rum, and textiles. Surabaya is the seat of a mint, an arsenal, and a cannon foundry. Apart from elementary and secondary schools, there are university faculties for medicine, dentistry, law and economy, and a college where both navigation and marine engineering are taught. Population (est.), 800,000.

Surat (*sōō-rāt'*), a city of India in the province of Bombay, on the Tapti River, 150 m. N. of Bombay. The city is a railroad junction and produces clothing, cotton and woolen goods, toys, earthenware, cigars, and machinery. Once the principal port of India, Surat carries on a large export trade. A fishing village in the 13th century, Surat rose to prominence as an embarkation point for Mohammedan pilgrims to Mecca. The Portuguese came into possession of it in 1512, and it was afterward held by the Dutch and French. In 1612, the English East India Co. established a trading center at Surat, which later became the seat of British Indian government and remained so until 1687. The city was of great commercial importance in the early 19th century. Pop., ca. 175,000.

Surgery (*sūr'jēr-y*), the branch of medical practice that relates to external injuries, deformities, and other morbid conditions to be treated directly by manual operations or by the application of instruments. Trepanation was known to the medicine man of prehistoric times and surgery was practiced with success among the Egyptians about 410 B.C. Surgical instruments for reducing dislocations of the bones are mentioned by Hippocrates, the celebrated Greek physician and writer of six surgical treatises, in the early part of the 4th century B.C. Greek surgeons were the most skilled of the ancient practitioners, and by them surgery was introduced in Rome. Considerable progress in surgery was made in the prosperous period of Arabia. Andrew Vesalius (1514-46), may be given much credit for his basic study in anatomy, and Ambroise Paré (1517?-90) is considered the founder of modern surgery.

The more correct views of the circulation of the blood published by Harvey, in 1616, and his lectures on surgery, aided greatly in developing the practice. The invention of improved surgical instruments by Fabricius, of Hilden, Germany, gave practitioners valuable assistance in treating complicated organs, such as the urethra and the ear. Surgery, like medicine in general, has profited much from the discoveries of Pasteur and from the discovery of anaesthesia. Others eminent in surgical practice include John Hunter, Sir

Joseph Lister, Ephraim McDowell, and Von Grafe. A multiplicity of instruments is employed in modern surgery. Among the most recent additions of value to the practice are skin grafting, so-called "plastic surgery," nerve stretching, successful excision of cancerous affections, radical cure for hernia, and the invention of instruments and the discovery of medicines rendering operations less painful and much more effectual. Brain surgery, or psychosurgery, which was greatly advanced by Dr. Harvey Cushing (1869-1939), has developed steadily (see *Psychiatry*). The discovery of the roentgen, or X-ray, has added to the efficiency of surgical practice.

The recent perfection of blood transfusions to be given before operation to rehabilitate the depleted patient, during operation to replace the blood loss, and after operation to support the patient has enormously expanded the field of surgery. Blood plasma has also proved useful. Penicillin and sulfonamide administration has lessened the incidence of wound infection and improved the results of operation. See also *Anaesthetics; Antiseptic; First Aid; Medicine; Sulfa Drugs; Wound; X-Ray*.

Surinam (*sōō-rī-nām'*), a river of South America, in Dutch Guiana; also, another name for the territory. The river rises in the mountains of the south central part, flows generally toward the north, and discharges into the Atlantic 16 m. below Paramaribo. The entire length is 380 m. It is navigable for the largest vessels about 40 m. and for ships drawing 10 feet of water for about 100 m. Valuable forests abound in the valley of the Surinam. Farming is carried on extensively between Paramaribo and the ocean. The Comewyne River joins the Surinam near its mouth. See *Guiana, Dutch*.

Surinam Toad (*sōō-rī-nām' tōd*), or *PIPA*. The term pipa designates a genus of amphibians of which the Surinam toad is the best known.

Surmullet (*sūr-mūl'ēt*), the name of a species of mullet found in the tropical seas. It is a common fish in the Mediterranean, where it attains a weight of 8 to 10 lbs. The flesh is highly esteemed for food and was prized as an article of commerce by the ancient Romans.

Surrealism (*sū-rē'al-iz'm*), an art movement originated (1924) by the French writer André Breton. Its expression in poetry, painting, and sculpture is characterized by a tendency to express psychic automatism in clearly defined realistic forms. Within the canvas or poem, however, the single forms or parts of the content may appear disconnected and not directed by any of the conventional rules of reality or logic. See also *Dali, Salvador*.

Surrey (*sūr'ī*), a light, horse-drawn vehicle with four wheels, usually provided with two seats. The box-shaped body is built somewhat like that

of a phaeton. The top, when used, is a flat, often fringed, canopy.

Surrey, a county of southeastern England, containing 758 sq. m. Across its center run from east to west the North Downs. Lying south of the Thames River, Surrey includes part of Greater London. Many ancient remains indicate traces of pre-historic civilization in Surrey. In addition to the Thames, the hilly country of Surrey, rich in clay and chalk, is drained by the Mole and Wey Rivers. Largely residential, the county also has agricultural interests, including hops, wheat, oats, and garden produce, as well as manufactures, such as processed fuller's earth, paper, pottery, and beer. Kingston is the county town. Population, *ca.* 1,500,000.

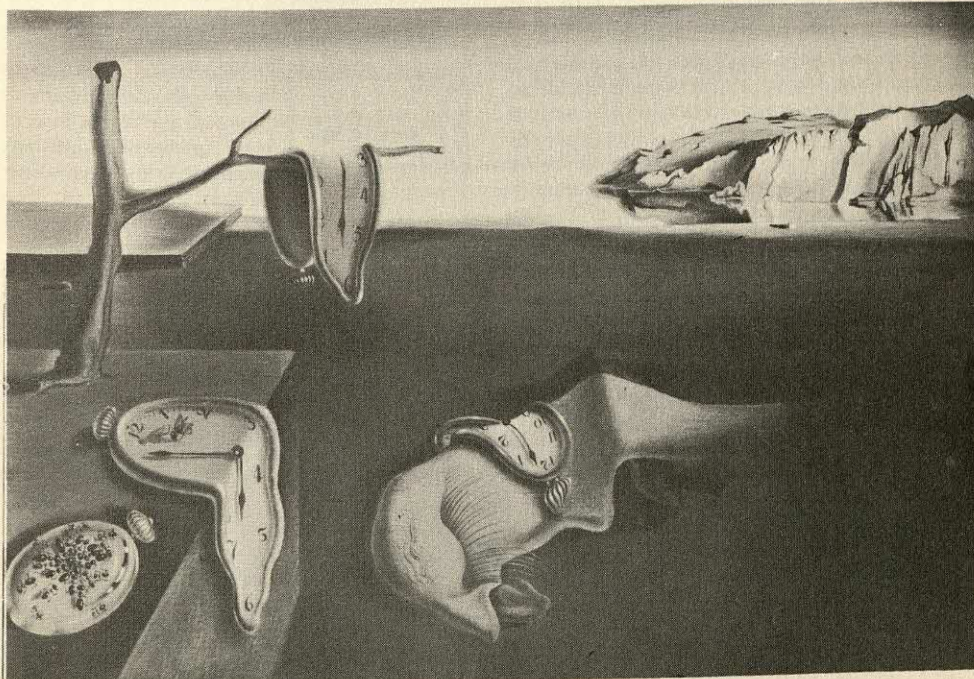
Surrey, HENRY HOWARD, EARL OF, soldier and poet, born in England, in 1517 or 1518; executed on Tower Hill, London, Jan. 19, 1547. He was the eldest son of Thomas Howard, third duke of Norfolk, and Elizabeth Stafford, daughter of the Duke of Buckingham. In 1532, his cousin, Anne Boleyn, then about to become queen of Henry VIII, arranged a marriage for him with Lady Frances de Vere, daughter of the 15th earl of Oxford. In the same year he spent several months at the French court. He took part in the

campaign against the rebels in Yorkshire and Lancashire (1536) and in a Scottish expedition (1542). He was knighted and became chancellor of the duchy of Lancaster in 1541. He served with English forces in France (1543-45), acting as commander at Boulogne and lieutenant-general of the king. Pride in his family and a quarrelsome temper got him into trouble on several occasions. Following his replacement in the command at Boulogne by Edward Seymour, Lord Hertford, he refused to permit the marriage between his sister, the Duchess of Richmond, and Sir Thomas Seymour. As Henry VIII lay dying in August 1546, Surrey's long-standing enmity with the Seymour faction reached a crisis, perhaps because of his haughty assumption that his father would become protector of the youthful Prince Edward. In any case, Surrey and his father were accused of determining the succession (by making illegal use of the heraldic arms of Edward the Confessor) and conspiring to usurp the throne. On Jan. 13, 1547, Surrey was tried at the Guildhall on charges of high treason and was condemned by a "packed" jury to be hanged, drawn, and quartered at Tyburn. The sentence was commuted to beheading, and he was executed on Tower Hill.

SURREALISM

The Persistence of Memory. Painting by Salvador Dali

Collection Museum of Modern Art, N. Y.





EARL OF SURREY

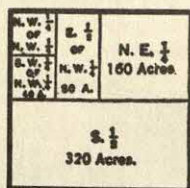
In spite of his short and exceedingly eventful life, Surrey was a carefully educated man and found time to compose some of the most beautiful courtly poetry of his time. According to the romantic legend perpetuated by Thomas Nashe ("The Unfortunate Traveler," 1594) and Michael Drayton ("England's Heroical Epistles," 1594), Surrey's love sonnets were inspired by the "fair Geraldine," whose face he had perceived in a magic glass in The Netherlands. Geraldine has been identified with Lady Elizabeth Fitzgerald, who was brought up at court with the Princess Elizabeth. Surrey's sonnets and lyric poetry were noted for their fluency and charming sentiment. He, along with his master, Sir Thomas Wyatt (1503-42) introduced the Elizabethan, or Shakespearean, sonnet (three quatrains with alternate rhymes and a final couplet). In his translations of the second and fourth books of the "Aeneid," Surrey was the first to employ blank verse, later used by generations of English poets.

Surrogate (*sûr'ô-gât*), in general, a substitute. In ecclesiastical affairs, the surrogate is a person appointed by an ecclesiastical officer to succeed him in office. In legal terminology, the surrogate is a probate judge who has jurisdiction over the probate of wills, handling of decedents' estates and in certain states the supervision of infants' guardians, etc.

Surveying (*sûr-vâ'ing*), the science of determining the area and configuration of portions of the surface of the earth and representing them on maps. It is a branch of applied mathematics and includes land surveying and marine surveying. *Land surveying* is the art of applying the principles of geometry and trigonometry to the measurement of land, either on a small or a large scale. *Marine surveying* has reference to the measurement of shoals, coasts, and harbors, including a complete determination of the con-

SURVEYING

tour of the bottom of a harbor or other bodies of water. In *plane surveying* the surface is looked upon as a plane; this form is used in measuring small areas. *Geodetic surveying* is employed to determine the latitude and longitude of places and the relative length of terrestrial arcs in different latitudes. This art or science is called *geodesy*. *Topographical surveying* involves all the operations incident to finding the contour of a portion of the earth's surface, such as hills, valleys, water courses, and embankments, and the various methods of representing them upon a plane surface. *Hydrographical surveying* is the term employed to designate the surveys which locate inlets, shore lines of harbors, and other matters incident to coastlines. A *reconnaissance survey* is one hastily made for military and other purposes. *Railroad and highway surveying* embraces surveys intended to ascertain the best line of communication between two given points. *Mining surveying* relates to the determination of the situation and position of the shafts, galleries, and other underground excavations of a mine already built, or surveys for the construction of mines not yet opened. The principal operations in surveying land include laying down base lines and driving triangles on either side of the base. Among the instruments used are the steel tape, for measuring the linear dimensions to ascertain the area of a given tract of land; the theodolite, for determining the accuracy of angles; and instruments known as the transit, plane table, zenith sector, azimuth, etc.



SUBDIVISIONS OF THE SECTION

When the early settlements of America were founded, the claims to land were governed largely by streams, hills, and other natural demarcations, thus making individual possessions quite irregular in outline. Soon after the establishment of the nation under the Constitution, and before it had acquired new territory, a general system of surveys for all public lands was devised. Accordingly all land owned and offered for sale by the general government was laid out in townships, each six miles square, as nearly as the spherical form of the earth's surface would permit.

In surveying a tract of country the government, both in Canada and the U.S., first establishes a line in a north-south direction, called the *principal meridian*, and then a line crossing it at right angles, parallel to the Equator, called the *base line*. Lines six miles apart are next run in both directions, those parallel to the principal meridian forming the *range* and those parallel to the base line the *township*, each being numbered

consecutively from the point of beginning. A tract six miles square is called a township and consists of 36 sections. Each section is one mile square, thus containing 640 acres. The sections are numbered from one to 36 and are subdivided fractionally, as shown in the diagram. In describing land it is customary to give the fractional parts of a section, as the south half, the east half of the northwest quarter, the southwest quarter of the northwest quarter, etc. Interference in regularity by the curvature of the earth's surface and the contour of the region surveyed requires correction lines at the north and west sides of each township, where the sections are usually fractional, while all others are intended to include the exact number of acres in a section of regular size. Sections 16 and 36 were set apart for school purposes in some states. See also *Level*; *Radar*; *Theodolite*; *Transit*.

Susa (*sōō'sā*), an ancient city of Persia, which was situated on a plain near the Karun River, a stream flowing into the Persian Gulf. It is mentioned as Shushan in the books of Daniel and Esther, and is thought to have occupied a large tract near the modern village of Sus. Tracings of its name and plan have been discovered on Assyrian monuments dating from the reign of Assurbanipal, about 600 B.C., when it formed a part of Babylonia, but later it came under the Persian rule of Cyrus. Subsequently it became the capital of Persia and was the seat of great riches. When Alexander the Great conquered it, in 325 B.C., he obtained vast treasures of gold, silver, and precious stones from its palaces and citadels, and in 315 B.C. it fell under the control of Antigonos. It was so completely destroyed soon after by the Arabs that even its site was for-

gotten. Recent excavations have led to a discovery of the lost city. Among its extensive ruins are traces of the palace described in Esther. In several places on its former site are remains of monuments bearing numerous cuneiform inscriptions.

Susquehanna River (*sūs-kwē-hān'ā rīv'ēr*), an important stream of Pennsylvania, which is formed in Northumberland County by the union of its eastern and western branches. The eastern branch rises in Otsego Lake, in southeastern New York, and is 250 m. long; the western branch has its source in the Allegheny Mts. of Pennsylvania, and has a length of 200 m. The main stream of the Susquehanna has a course of 150 m., extending from the union near Northumberland in a southwesterly direction until it is joined by the Juniata, when it assumes a southeasterly course and flows into Chesapeake Bay. The branches afford fine water power and both they and the main stream have valuable fisheries. The Susquehanna is a wide and shallow stream and is not navigable except by extremely shallow craft, of little commercial importance. Among the cities on its banks are Harrisburg and Wilkes-Barre, in Pennsylvania, and Owego and Binghamton, in New York.

Sussex (*sūs'ěks*), a maritime county of southeastern England with an area of 1,458 sq. m. Traversed by the South Downs which culminate in Beachy Head, a lofty chalk cliff, the country also contains fertile and densely wooded sections, such as the Weald. The well-known breed of Southdown sheep graze on the Down lands; agriculture, cattle raising, fishing, and gypsum mining are the chief occupations. Sussex contains several seaside resorts, such as Brighton

SUSSEX FARMYARD

Courtesy British Information Services, N. Y.



SUTHERLAND

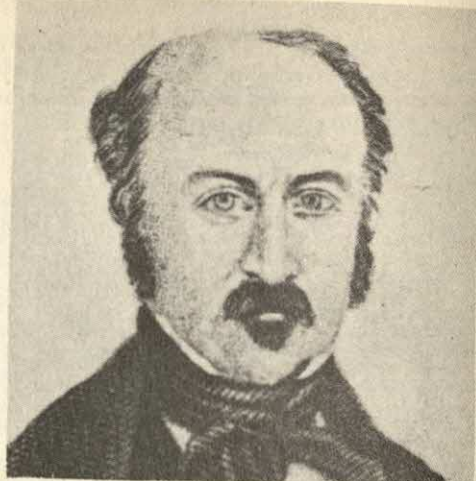
and Eastbourne. The county has two historic landmarks: the landing sites of Ella in 477, and of William the Conqueror in 1066 at Pevensey. Sussex also contains the battlefields of Hastings and Lewes. Population, *ca.* 750,000.

Sutherland (*sūTH'ēr-land*), a coastal county located in the extreme northwest section of Scotland, bordering on the Atlantic Ocean and the North Sea. Its 2,028 sq. m. consist largely of densely forested mountainous surface, abounding in deer woods and grouse moors. Many hunters and fishermen are attracted to this region. The principal occupations are sheep raising and fishing, the salmon fisheries being quite extensive. Although reclamation has been conducted, little of the land has been successfully cultivated; some oats, barley, and potatoes are grown. The principal river is the Oykel, and one of the few large lakes is Loch Assynt, over 6 m. long. Dornoch, the capital, and Lochinver are popular vacation resorts. Gaelic is spoken to some extent. Population, *ca.* 16,000.

Sutlej (*sūtlēj*), a river of northwestern India, one of the five great rivers in the Punjab. It rises in an elevated lake of Tibet and flows through the Himalayas, where the sides of its narrow gorge attain a height of several thousand feet. The general course is toward the southwest, entering the Indus River at Mithankot. It is known as the Ghara River below the confluence with the Beas. The entire course is 875 m.

Suttee (*sū-tē'*), a form of funeral sacrifice formerly practiced among certain castes of India, now prohibited by statutory law. The sacrifice consisted of the widow being burned with her dead husband on the funeral pyre; if he died at a distance, the widow was sacrificed on a pyre erected for that purpose. It was instituted as a religious rite from the notion that great men should be accompanied into the other world by their wives, weapons, horses, and favorite jewels, by having them either burned or buried along with the deceased. The practice was prohibited by law in 1829.

Sutter (*sū'tēr*), JOHN AUGUSTUS, pioneer, born in Kandern, Baden, of Swiss parents, Feb. 15, 1803; died at Washington, D.C., June 18, 1880. In 1834, he came to the U.S. and four years later went overland (via the Oregon Trail) to California. Granted 49,000 acres of land by the Mexican governor for the establishment of a Mexican frontier post, Sutter developed a settlement known as New Helvetia (Sutter's Fort), present site of the city of Sacramento (*q.v.*), Cal. Director of this district under the Mexicans, he continued the development after 1846, when the American troops under Frémont took over the land. In February 1848, while digging for a new mill, gold was discovered on his estate.



JOHN A. SUTTER

The rush of prospectors that followed drove him from his land. After prolonged efforts, he finally obtained a pension from the government of California.

Suttner (*zōōt'nēr*), BERTHA, BARONESS VON, writer and worker for world peace, born June 9, 1843, in Prague, Czechoslovakia; died June 21, 1914, in Vienna, Austria. Baroness von Suttner spent almost her entire life working for world peace. She founded the Austrian Society of Friends of Peace in 1891 and as its president made her influence felt at peace congresses in Bern, Antwerp, and Hamburg during the 1890's. Baroness von Suttner served for a time as secretary to Alfred Nobel and, in 1905, was awarded the Nobel Peace Prize. She was the author of many books, almost all of which, including her novels, denounced war and attempted to further the cause of world peace. These books include "High-Life" (1886), "Lay Down Your Arms!" (1889), and her "Memoirs."

Suture (*sū'tūr*), in anatomy, the joints between the individual parts of the skull bones; in surgery, any series of stitches made in order to close a wound.

Suvorov (*sōō-vō'róf*), SUVAROFF, or SUVAROV, COUNT ALEKSANDR VASILIEVICH, field marshal, born in Finland, Nov. 25, 1729; died in St. Petersburg (now Leningrad), Russia, May 18, 1800. His lifelong military career began with the Seven Years' War (*q.v.*). Among the highlights of his career were his victories over the Cossack rebels under Emelyan Pugachev in 1773-74 and over the Poles under Thaddeus Kosciuszko (*q.v.*); at Rymnik (1789), during the Russo-Turkish war of 1787-92; and at Cassano, the Trebbia River, and Novi (1799), as a result of which the Napoleonic armies were driven from Italy. He was never defeated in the field.

Svalbard (*sväl'bär*). See *Spitsbergen*.

Svedberg (*svād' bār-ē*), THE (THEODOR), chemist, born in Valbo, Sweden, Aug. 30, 1884. He was educated at the Univ. of Upsala, where he served as lecturer (1907 *et seq.*) and professor (1912-49) of physical chemistry. He was made director of Gustaf Werner Inst. for Nuclear Chemistry in 1949. Noted for his research in colloid chemistry, he won the Nobel Prize for chemistry in 1926 for his work on disperse systems.

Sverdlovsk (*svård-lófsk'*), a city in the western central U.S.S.R., ca. 850 m. E. of Moscow. Capital of Sverdlovsk region (ca. 85,200 sq. m. in area), in the Russian S.F.S.R., it is located in the eastern foothills of the Ural Mts., on the Iset River. An industrial center—steel, iron, heavy machinery, chemicals, and textiles—it is the hub of a rail system linking the northern Urals with western Siberia. Around it is a heavily exploited mining region. The Urals State Univ. is located in the city. Founded ca. 1720 and named Ekaterinburg, it was renamed in 1924 for a Soviet hero, Yakov Sverdlov. The last royal family was held here and executed in 1918. Much of the city's growth dates from World War II. Population, 1959, 777,000.

Swabia (*swā'bi-ā*), or SUABIA, in German *Schwaben*, an ancient duchy of southwestern Germany, occupying the area covered by Baden, Württemberg and a part of Bavaria, so called from the Germanic Suevi, a tribe who occupied it in the 5th century. It had been called Alemannia previous to that time, from the Alemanni, its inhabitants before the Swabian invasion, who had driven out the Celts in the 1st century B.C. Swabia included about 13,000 sq. m. in the 5th century, when the Swabians and Alemanni were united under Swabian dukes. In 1080, the region became a possession of Count Frederick of Hohenstaufen, who made it the nucleus of Germany, and for centuries it was the most powerful and progressive of the German possessions. After the extinction of the Swabian line, the country became involved in prolonged wars, of which the Peasants' War of 1525 and the Thirty Years' War from 1618-48 were the most disastrous. During World War II it was the scene of many battles between the Allies and retreating German forces. After the war, parts of the region were included in the American and French zones of occupation. A division of Bavaria called Swabia has an area of 3,805 sq. m. and a population of ca. 1,250,000. The seat of government is at Augsburg.

Swallow (*swōl'ō*), an extensive genus of birds found in all parts of the world. They are distinguished by a short, depressed bill with a wide gape, long, pointed wings, the tail more or less forked, and weak feet. Swallows are birds of powerful flight and spend more time on the wing than other birds. It is not unusual

to see them soaring high in the air, describing great circles, usually flying singly and uttering shrill cries. They feed chiefly on insects, which they catch while flying, and some species even scoop water from the surface of ponds and streams while on the wing. The nests are built of straw and feathers, usually under the eaves of buildings and on rocks, and some species find a home in small houses built for that purpose.

The *common swallow* is native to Europe, Asia, and Africa. It attains a length of about 9 in. and has a steel-blue color on the back and wings, with reddish markings below. It is frequently called *chimney swallow* from its habit of building nests near the chimneys of houses, where it lays its eggs and rears the young. Two broods are produced in a year. This species migrates to the warmer parts in the winter, and its return to Western Europe is a harbinger of spring. The song is a mere twitter, which is heard most frequently as the birds gather in large flocks in autumn to migrate.

The *sand martin* is a species widely distributed in America and Europe. It has brownish plumage and is found largely along sandy banks of rivers and in sandpits, where it excavates galleries for nesting purposes. These galleries are often 3 to 5 ft. long, more or less tortuous, and are excavated with the bill. The *purple swallow* is widely distributed in America and is so named from its purple-bluish color. Other species include the *cliff swallow* of North America, the *fairy martin* of Australia, and the *window swallow* of Europe. Swallows, like owls, eject the undigested portions of their food in small pellets or castings. They closely resemble the swifts, which are often mistaken for swallows, and also the sea-swallow, or tern. The fairy martin of Australia is a small species, and, like the allied species of China and the East Indies, builds flask-shaped nests that are gathered and sold in the market as edible and highly favorite food. This food is dissolved in water and used in preparing gravy and soup.

Swallowtail (*swōl'ō-tāl*), any butterfly belonging to a family of butterflies which have prolonged hind wings looking like tails. There are 35 species known in the U.S.; they occur in green, blue, yellow and black colors.

Swamp (*swōmp*). See *Marsh*.

Swampscott (*swōmp'skōt*), a resort and residential town in Massachusetts, in Essex County, on Massachusetts Bay, ca. 12 m. N.E. of Boston. It is served by the Boston & Maine R.R. Most of the residents commute to Boston or Lynn. Local landmarks are the Humphrey house (ca. 1635) and the Mary Baker Eddy house. Swampscott was incorporated in 1852. Population, 1960, 13,294.

Swamp Tea Tree. See *Cajuput Tree*.

Swan (*swōn*), a genus of web-footed birds of the duck family. They are among the largest and

most beautiful of aquatic birds. Naturalists recognize a number of well-marked species, more or less widely distributed, and they are migratory in a wild state. The neck is long and arched, and when swimming it is bent in an S-shaped curve. Swans have a hiss resembling that of geese, which is heard chiefly when the bird is disturbed. They defend themselves by striking blows with the wings. Young swans are called *cygnets* and have a bluish-gray color, with a dark-hued bill. When full grown, the *common swan* measures about 5 ft. and weighs fully 30 lbs. The feathers are a pure white, and it takes great pride in washing and keeping them clean. This species is native to the northern and western parts of Europe, whence it moves in the fall toward the tropical regions. It has been domesticated as an ornamental bird for gardens and parks, for which purpose it is kept extensively in America and all the European countries.

The *American swan* breeds in the northern part of North America, usually laying 10 to 12 eggs in the rushes near the water, and in the fall moves southward to the Carolinas. While its appearance is much like that of the common swan, it is somewhat smaller. It is remarkable that all the species of swans native to the Northern Hemisphere are white, while those of the Southern Hemisphere are black or have black markings. The South American *black-necked swan* is white, but has a black neck and a bright red knob at the top of the bill. It has been domesticated and is reared as a park or barnyard ornament. The *black swan* of Australia is black with white markings and had a reddish bill. It is usually seen in flocks of 8 or 10. It has been tamed and is grown to some extent. An American species called the *trumpeting swan* is noted for its musical cry and is singular for having a large cavity in the breastbone in which the windpipe coils before passing to the lungs. Swans were formerly eaten to a considerable extent, but are now reared only on a limited scale for ornament and their feathers. It was once erroneously supposed that the swan sings a song just before dying, called the *song of the dying swan*, or *swan song*.

Swansea (*swŏn'sē*), a seaport city of Wales, in the County of Glamorgan, at the mouth of the Tawe River, 43 m. n.w. of Cardiff. The harbor in Swansea Bay, an inlet from Bristol Channel, is well improved by wharves and masonry. Anciently it had a fine castle, but this structure was dismantled in 1647. Population, ca. 165,000.

Swarthmore (*swŏrth'mŏr*), residential town of Delaware County, Pennsylvania, 11 m. s.w. of Philadelphia. Incorporated in 1893, the town, located in a wooded section near the Delaware River, is the site of Swarthmore Coll., founded by the Society of Friends in 1864 (see *Universities and Colleges*). Also in the town is the

house of Benjamin West (*q.v.*), built in 1724. Population, 1950, 4,825.

Swastika (*swŏs'tī-kŏ*), a hooked cross known as early as prehistoric times, when it was a symbol of the sun. It has been found among many peoples, on all continents, and in many stages of culture, e.g. in India, Mongolia, North and South America, and Palestine. It is the state badge of Finland and the National Socialist movement in Germany adopted it as well. It was formerly considered a good-luck sign.

Swatow (*swă'tou'*), or SHANTOW, a port in Kwangtung Province, Southern China, at the mouth of the Han River. Its export trade consists of sugar, tea, oranges, paper, tobacco, grass cloth, and lace; its fisheries are also important. Population, ca. 175,000.

Swaziland (*swă'zē-lănd*), British Protectorate in South Africa, named for a native chief of the 19th century, located in the eastern part of South Africa, between Transvaal, Portuguese East Africa, and Natal (Zululand). Swaziland is not a part of the Union of South Africa although its government under a resident commissioner is responsible to the High Commissioner for South Africa. Its area of 6,705 sq. m. consists of considerable cattle-ranching, sheep-grazing and agricultural land. Maize, Kaffir corn, tobacco, and fruits are grown. Its climate is healthful, and the population consists largely of native Swazis, a Zulu-Kaffir race, and a few thousand whites. In 1910, the country came under the protection of the South African Customs Union. Transportation depends on roads, such as the one from Mbabane, the capital, into the Transvaal. Population, ca. 157,000.

Sweat (*swēt*), or PERSPIRATION, the secretion (*q.v.*) of the sweat or sudoriferous glands of the skin. It consists of a transparent, colorless, aqueous solution of neutral fats, volatile fatty acids, cholesterin, traces of albumin and urea, free lactic acid, sodium lactate, sodium chloride, potassium chloride, and traces of alkaline phosphates. Most of these substances are waste products extracted from the blood and lymphatic system (*q.v.*). The *sweat glands* are microscopically small and are situated in the true skin and loose subcutaneous tissue; they consist of convoluted tubules from which the excretory ducts pass outward through the skin. These ducts pass through the epidermis in a more or less spiral course to open onto the surface via openings called *pores*. The effect of sweating is both to cool and cleanse the body. It is estimated that from one to four pounds of this fluid pass away from the skin in 24 hours. The portion which is evaporated as fast as it is carried to the surface of the skin is called *insensible perspiration* and that which accumulates on the skin is termed *sensible perspira-*



Courtesy Swedish Traffic Assn., Stockholm

SWEDEN. VIEW OF THE SYLARNA MOUNTAINS

tion. In some diseases, as in rheumatism and tuberculosis, the sweating is profuse, while in some fevers it is greatly diminished. The former condition is called *hyperidrosis*, while the latter is termed *anidrosis*.

Bloody sweat, sweat containing blood, is due to disease or injury of tissue immediately underlying the skin. *Blue sweat* is a sweat with a bluish color, thought to be due to oxidation of a colorless substance, called indican, secreted in sweat. *Green sweat* is a sweat having a blue-green or greenish color, seen mainly in copper workers. It is due to copper taken into the system by inhalation of particles or fumes or with food and drink. *Night sweat* is a drenching cold sweat occurring at night. It is characteristic of certain severe debilitating diseases such as tuberculosis and rheumatic fever.

Sweatshop (*swēt'shōp*), a place where employees work under the *sweating system*. Manufacturers pursuing this system exploit laborers by supplying them with piece-work to be done at home or in small shops at starvation wages. The sweating system has been applied in many large cities, especially in the clothing and cigar industries. Payment is made on the number of pieces completed rather than on hours worked, thus speeding up production unfairly, lengthening working hours, and providing unfair competition. Other evils of the sweatshop include exploitation of child labor, evasion of factory regulations, concerning cleanliness, safety, hours, light, ventilation, pay, etc.

Beginning in England in the 19th century, the sweating system developed in the U.S. during the

Civil War (1861-65). A large supply of unskilled labor, lack of government inspection and regulation, and failure of labor to unite all contributed to the spread of the sweatshop in America. However, as public opinion grew in opposition to long working hours, poor pay, and unsanitary conditions, government regulation of the sweating system came into existence. Legislation has been directed against this system in many countries, with the view of prohibiting the employment of children and improving the working and sanitary conditions of the smaller and overcrowded workshops. Trade unions and the establishment of larger corporations have done much to relieve the unfavorable conditions formerly very harmful to the health of laborers. With the passage of the Fair Labor Standards Act (*q.v.*) of 1938, popularly known as the Wage and Hour Law, and subsequent government inspection of factory conditions, the sweating system has visibly decreased.

Sweden (*swē'dən*), called *Sverige* in Swedish, a kingdom of Northern Europe, occupying the southern and eastern part of the Scandinavian Peninsula. It is bounded on the w. and n. by Norway, e. by Finland, the Gulf of Bothnia, and the Baltic Sea, s. by the Baltic Sea, and s.w. by the Öresund Straits which separate it from Denmark, and the Kattegat. The length from north to south is 978 m., the breadth is 310 m., and the area is 173,296 sq. m. It is formed of three principal divisions, which are Norrland in the north, Svealand in the center, and Götaland in the south. The coast line of 4,738 m. is deeply indented by gulfs and the mouths of rivers. To

Sweden belong many islands of the Baltic Sea, including Oland and Gotland.

DESCRIPTION. Sweden is separated from Norway by the Kjölen mountain range, or Scandinavian Alps, but these highlands are chiefly in Norway, where they are more rugged and precipitous in character. In Sweden they form a plateau about 4,000 ft. high, from which occasional peaks rise to a greater altitude. From the boundary these highlands slope gradually toward the east and decline into hills of moderate elevation to the seashore. Sarjektjakko, 6,850 ft., and Kaskasatjakko, 6,810 ft., are the highest summits. The greatest elevations are in the north-west, where Kebnekaise attains a height of 7,004 ft. In the southern part the country is very level. Here the great plain of Scania, the most fertile tract of the peninsula, covers considerable territory. The northern part is bleak, rocky, and barren, and made impressive by snowclad hills.

The drainage is chiefly toward the east and south into the Gulf of Bothnia and the Baltic. While the rivers afford much water power, they are too rapid for extensive navigation. The Tornea and its largest northern tributary, the Lainio, form the boundary with Finland. Among the rivers that flow into the Gulf of Bothnia, passing in their order southward, are the Kalix, the Lulea, the Pitea, the Skelleftea, the Gideå, and the Indals. The Dalälven is the largest river that discharges into the Baltic. Lake Vänern, which receives the Klarälven, discharges through the Götaälv into the Kattegat. The beds and banks of the rivers are more or less rocky and many are connected with the lakes that fairly dot many parts of Sweden. Vast canal improvements have rendered the lakes of great utility for inland commercial enterprises. Lake Vänern has an area of 2,014 sq. m. and other lakes include Vätter, Mälär, Tornea, and Hjälmarén. These and other lakes are situated in the southern part of Sweden. Stora Luella is in the northern part.

The climate is colder than in Norway, since the country is shut off from the influence of the Atlantic by the Kjölen Mts. In the southern part it is quite favorable, but the northern section has an extremely long and cold winter. The summers and winters succeed each other with scarcely an intermission of spring or autumn. At Stockholm the mean temperature is 28° F. in January and 63° in July, and in the northern part the thermometer falls as low as 40° below zero. The mean annual rainfall is 20 in., but it is scant in the north and quite abundant in the south, where it is 35 in. Snow covers the entire country in winter, when skis and sleighs are used extensively. The climate is singularly healthful in all sections of the country.

MINING. Sweden is rich in mineral wealth, but the output of coal is not sufficient to supply the

local demand. This mineral is obtained chiefly in the southern part and the annual output is placed at around 400,000 tons. Iron is the most important and valuable mineral product, yielding vast amounts, most of which comes from the district lying north of the Arctic Circle. Since the product is nearly free from phosphorus, the iron of Sweden is unsurpassed in the world, especially for the manufacture of steel. Large quantities are exported to foreign markets. Copper is mined extensively in Falun and large zinc ore mines are worked on the north side of Lake Vättern. Other minerals include alum, lead, manganese, cobalt, silver, tin and gold. A superior quality of granite is quarried for monuments and construction purposes. Clays, limestone, sandstone, and sand for glass making are widely distributed.

AGRICULTURE. Sweden is less mountainous and broken than Norway and is better adapted to agriculture, which is the leading industry. About one-third of the inhabitants are engaged in farming and most of the holdings average in size from 5 to 40 acres. The best farming district is in the southern part, where the soil is fertile and the climate quite favorable, and the tilling is conducted with great care. Oats and rye are the chief cereals. Some important crops are barley, potatoes, wheat, and hay. Sugar beets are cultivated in the southern part, since this enterprise receives encouragement by the government. Other crops are flax, tobacco, hops, apples, and small fruits. Cattle-raising is the most important livestock enterprise and dairying is conducted on high standards. Other livestock includes horses, sheep, swine, poultry, and reindeer (in the Lapland section).

MANUFACTURING. Manufacturing has progressed widely, owing to aid extended by the government in developing foreign and domestic trade. However, a lack of coal has made it impossible to produce enough to supply the demand in the more important lines, although hydroelectric power is growing in importance. Lumber is sawed in large quantities, both for home use and exportation. Textile fabrics, flour and grist, machinery, wood pulp, beet sugar, pipe tobacco and cigars, matches, and canned and cured fish are the leading manufactures. Stockholm and Göteborg are centers for the manufacture of cotton and woolen goods, and large linen factories are located at Norrköping. The steel goods, armor plate, cutlery, and nails made in Sweden are highly esteemed. Bofors contains renowned armament works. Motala and Eskilstuna are the principal centers of iron and machine works. Famous glass factories are located at Örebro and at Kosta.

COMMERCE AND TRANSPORTATION. Sweden has a large coastwise and foreign trade. The imports



Courtesy Swedish Travel Information Bureau, N. Y.

CHURCH SERVICE IN DALECARLIA PROVINCE

exceed the exports. Among the leading exports are lumber, minerals, metal goods, pulp, paper, ball bearings, glassware, motors, matches. The imports consist mainly of wheat, cotton, machinery, coal, and textiles. The railway lines in operation total about 10,400 m. and of these 2,900 m. or about 28 per cent are electrified. Private roads comprise at present 2,500 m., of which 500 m. have been electrified. An important line crosses the northern section, passing through the iron range from the Gulf of Bothnia to Narvik, in Norway. Well-established telegraph and telephone lines are in service. Canal construction received early attention and important connections are thus maintained with the rivers and lakes of the southern part. The highways are in an excellent condition, many having been improved according to modern engineering standards, and highway mileage totals more than 55,000.

GOVERNMENT. The government of Sweden is a constitutional monarchy and the crown is hereditary in the male line of descent. If there is no direct heir, the king is chosen by a majority vote of the national legislature, but the choice is limited to a member of the Lutheran Church. Besides having general executive power, the king has important functions in connection with legislative enactments of the diet or parliament, whose decrees he may veto for cause. He is aided by a Council of State and negotiates treaties, presides in the Supreme Court, and nominates military and civil officials. Legislative authority is vested in the diet, known as the *Riksdag*, which consists of two chambers. In the upper chamber are 150 members chosen by provincial and municipal councils for eight years, while the lower chamber consists of 230 members elected for four years by universal suffrage. The *krona* is the monetary unit. See *Coin*.

EDUCATION. Elementary education is free and compulsory. The school system in 1959 included more than 400 secondary schools, *ca.* 20 technical schools, and *ca.* 90 peoples' colleges. There are three state universities: at Uppsala, Lund, and Göteborg. In Stockholm is a state medical school and the private but subsidized Univ. of Stockholm. There are institutes of technology in Stockholm and Göteborg, and an institute of agriculture in Uppsala. In addition, the state supports schools for the deaf and schools of navigation and mining. The percentage of illiteracy in Sweden is remarkably low.

POPULATION. The majority of the people of Sweden are Scandinavians; other racial groups include Finns and Lapps. Lutheranism is the state religion and is practiced by most of the people, although freedom of religion is maintained. Social welfare is highly advanced, including universal old-age pensions and compulsory health insurance. Stockholm, on an inlet of the Baltic Sea, is the capital and largest city. Other major cities include Göteborg, Malmö, Norrköping, and Hälsingborg. Population, 1930, 6,224,468; in 1950, 7,041,829.

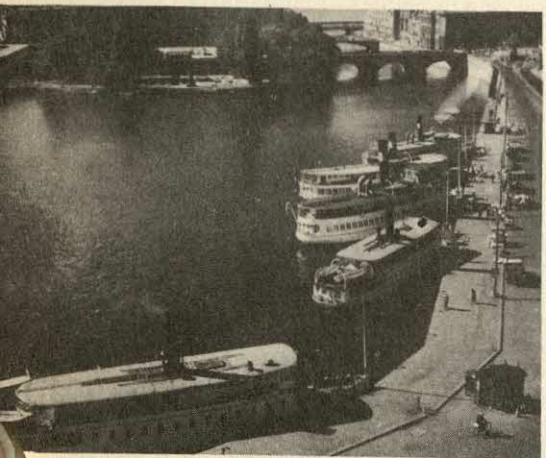
LANGUAGE AND LITERATURE. The Swedish people belong to the Scandinavian branch of the Caucasian family and are generally industrious and persevering. They are largely of a tall, robust stature, and have blue eyes, light hair, and a light complexion. It is probable that their language had its beginning more than 4,000 years ago, but little is known of it before the Christian era. The dialect is closely allied to that of Norway and less closely to the Danish and Icelandic. German had a wide influence upon the language in the time of the Hanseatic League and the introduction of Protestantism, and a considerable element of



Courtesy Swedish Travel Information Bureau, N. Y.

VIEW OF GÖTEBORG

The canals and the winding moat surrounding the old town tend to bear out the charge of Gustavus Adolphus that Dutch architects planned the town



Courtesy Swedish Travel Information Bureau, N. Y.

VIEW OF STOCKHOLM

The Parliament Building stands on the small island in the middle of the stream

Latin was injected through the clergy.

The more recent literature dates from the 13th century, but there is a translation of the Bible, known as *Ulfilas'* (*q.v.*) Gothic translation, which was made in the 5th century and is considered the oldest writing in the Germanic-Swedish tongues now extant. Heroic and chivalric ballads from the 13th century are numerous, while lyrics and biblical translations of the 14th century are quite extensive. In 1477 the Univ. of Upsala was founded, and the art of printing was introduced at Stockholm in 1483. The adoption of Protestantism in the 16th century brought hymns and poems into extensive use, but a complete translation of the New Testament was not made until 1526, when that beneficial work was completed by Olaus Petri. Laurentius, in 1541, trans-

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lated the Old Testament and wrote numerous hymns and poems. "Svensk Krönika" is a historical work written by Olaus, who is the author of a number of dramas. "Captive Cupid" is a poetic production of Stjernhjelm (1598-1672).

Swedish literature was greatly extended in the reign of Gustavus Adolphus, who imported large libraries, founded schools, and invited learned men from abroad to assist educationally. The name of Linnaeus stands pre-eminent among the naturalists of Sweden and of the world, and both his writings and pupils exercised a wide influence. In the 18th century many theological writers were added to the list. The literary men of that period include Olof von Dalin (1708-63), Emanuel Swedenborg (1688-1772), Torbern Olof Bergman (1735-84), Carl Linnaeus (1707-78), Anders Celsius (1701-44), Carl Wilhelm Scheele (1742-86), who also wrote in German, and Carl Michael Bellman (1740-95). Jakob Henrik Mörk (1714-63) is an eminent Swedish novelist; Jöns Jakob Berzelius (1779-1848), a celebrated chemist; Erik Gustaf Geijer (1783-1847) one of the noted historians; and Esaias Tegnér (1782-1846), one of the chief poets. Tegnér's most noted work is called "The Story of Frithjof" and has been translated into many European and Asiatic languages. Another great poet is the Finn, Johan Ludvig Runeberg (1804-77), famous for his epics. Fredrika Bremer (1801-65), a Swedish novelist, wrote many books on social conditions. Victor Rydberg (1828-95), is one of the most versatile writers and the author of "The Last Athenian," a famous novel. A truly fine modern lyric poet is Gustaf Fröding (1860-1911). One of the greatest names in modern Swedish literature is that of Johan August Strindberg (1849-1912), outstanding for his realistic dramas. In the field of the novel, Selma Lagerlöf (1858-1940), Nobel Prize winner, distinguished herself with such masterly writings as the "Gösta Berlings Saga" and others. Verner von Heidenstam (1859-1940), another Nobel Prize winner, produced several fine novels including "St. Brigitta's Pilgrimage." Present-day Swedish literature contains such names as Pär Lagerwist, Vilhelm Moberg, Sigfrid Siwertz and others.

HISTORY. The early history of Sweden is wrapped in legend. In the primitive historic stage numerous tribes occupied the different sections. In the southern part were the Goths, from whom the region is still called Gothland, and in the central part or Svealand were the Swedes. These two groups comprised the most powerful of the native tribes. Christianity was introduced in 830, but the old pagan religion was not overthrown until in the reign of Ingjald, when the temple of Upsala was burned. Eric the Saint succeeded to the throne as ruling sovereign in 1150, and under his direction Christian doctrines

were disseminated by the building of churches and schools, but he was slain in 1160 by Magnus Henriksen, a Danish prince. Margaret of Denmark was chosen queen in 1389 and Sweden soon joined the Union of Kalmar. In 1523, Gustavus Vasa defeated the Danes and was made king. In 1527 he made the Lutheran faith the national religion. Though he found an empty treasury and an exhausted country, he established industries, built cities and highways and founded institutions of learning. He made the throne hereditary rather than elective. He was succeeded by his son, Eric XIV, who reigned only eight years, and his brother ascended the throne as John III. It was the desire of John to restore the Catholic faith, but he died in 1592, to be succeeded by his son, Sigismund. The latter had been brought up in the Catholic faith and followed the course of his father in seeking to restore Catholicism, though he had previously promised to support the Protestant faith, and was accordingly deposed, in 1598, and the crown was given to his uncle, Charles IX, in 1607.

Charles IX died in 1611 and was succeeded by his son, the celebrated Gustavus Adolphus, who took a leading part in the Thirty Years' War by invading Germany to defend Protestantism, but lost his life in 1632 at the Battle of Lützen. Gustavus had left his noted minister, Axel Oxenstierna, to administer the government in his absence, and he was appointed regent for Gustavus's daughter, Christina, who came to the throne in 1644. In 1654, she renounced the crown in favor of her cousin, Charles Gustavus, who assumed the title of Charles X. After conducting successful military enterprises in Denmark, Poland, and Russia, he died suddenly and was succeeded by his son, Charles XI, in 1660. This sovereign was only five years old when his father died and thus ruled under a regency until 1672, when he assumed the government. He greatly extended the power of the king, reorganized the army, and encouraged industrial arts. On his death, in 1697, he was succeeded by his son, Charles XII. This military genius conducted extensive operations against Poland, Denmark, and Russia, but was finally defeated at Poltava on June 28, 1709. As a result he had to yield to the military superiority of the Muscovites. He subsequently pursued a scheme to conquer Norway, but on Nov. 30, 1718, was killed at Frederickshald in Norway. Ulrica Eleonora, his second sister, succeeded him on the throne. She was assisted in the government by her husband, Frederick of Hesse-Cassel.

Both Eleonora and her husband, Frederick I, were mere puppets in the hands of the nobles, and Sweden was dominated by a powerful oligarchy. The two parties were known as the French, or *Hats*, and the Russians, or *Caps*, the

former favoring French and the latter Russian dominance in Sweden's foreign policy. Frederick died in 1751 and was succeeded by Adolphus Frederick of Holstein-Gottorp; the new king was favorable toward Russia. He died in 1771 and was succeeded by his son, Gustavus III, who subdued the two factions and recovered the former power of the crown. Factional disagreements, however, caused his assassination in 1792, and he was succeeded by his son, Gustavus IV. During his reign Sweden lost Finland in a war with Russia. This sovereign lacked ability to cope with the difficulties of his time and he was finally deposed in 1809, being obliged to renounce the crown in favor of his uncle, Charles XIII. The dominant party elected Jean Baptiste Bernadotte, one of Emperor Napoleon's marshals, as crown prince in 1810 with the erroneous idea of thereby conciliating Napoleon.

Sweden joined the allies against Napoleon in 1814, but Denmark declared in favor of France, thus bringing on a war with the Swedes. The peace of 1814 gave Sweden possession of Norway, but it lost Pomerania to Denmark. Bernadotte ascended the throne in 1818 as Charles XIV and reigned successfully until his death, in 1844, when he was succeeded by his son, Oscar I. His reign was peaceful and enabled Sweden to begin material industrial development. On his death, in 1859, he was succeeded by his son, Charles Louis Eugene, as Charles XV. He died in 1872 and his brother, Oscar II, was crowned as his successor.

The long reign of Oscar II, a period of 36 years, was signally successful. It witnessed extension of the right of suffrage, the enlargement of the merchant marine, and important development in the country's industries. One of the problems of the dual kingdom under this sovereign was to satisfy the people of Norway, who finally declared their independence in 1905. The separation was brought about without bloodshed, largely through the self-restraint of King Oscar. In the later years of Oscar's reign, the Crown Prince Gustaf frequently acted as regent, and on the death of Oscar in 1907 the latter became king Gustaf V. His 43-year reign brought further social and industrial progress to the country. Gustaf V died in 1950 and was succeeded by his son Gustaf Adolph as Gustaf VI.

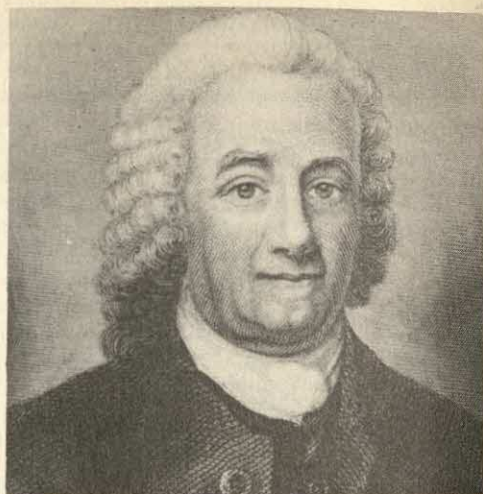
In recent decades Sweden has pursued a policy of remaining aloof from international problems, maintaining strong commercial ties with all belligerents during World Wars I and II. Sweden was admitted to the U.N. in 1946. She also became a participant in the European Recovery Program (*q.v.*). In keeping with her policy of neutrality Sweden did not join in the signing of the North Atlantic Treaty (*q.v.*).

Swedenborg (*swě'den-börg*), EMANUEL, author and scientist, born in Stockholm, Sweden,

SWEDENBORG

Jan. 29, 1688; died in London, Mar. 29, 1772. He was a son of Jesper Svedberg, bishop of Skara, and studied at the Univ. of Upsala, whence he was graduated with high honors. In 1710, he entered upon an extended tour of Europe that covered four years, visiting in these years Holland, Germany, France, England, and other countries. On returning to Sweden, he was appointed by Charles XII as assessor extraordinary to the Royal Coll. of Mines. In that capacity Swedenborg carried out the astonishing engineering feat, planned by Polhem, of transporting two galleys, five large boats, and a sloop, some 17 m. overland, enabling the king to bring his heavy artillery to bear on the walls of Frederickshall, which he was then besieging. During this period he also wrote a treatise on the orbit and position of the earth and planets, prepared an extended outline on algebra, devised a monetary system, and published several lectures on the tides. Queen Ulrica, in 1719, recognized these services by ennobling the Svedberg family and changing the name to Swedenborg. He gave little heed to official formalities, but occupied himself with mechanical and economical projects, and in 1724 declined a professorship of mathematics at Upsala.

In 1734, Swedenborg published "The Philosophy of Minerals," which attracted the attention of the most distinguished scholars of Europe. About the same time he published "First Principles of Natural Things," "The Infinite and the Final Cause of Creation," and the "Intercourse Between the Soul and the Body." From 1736 to 1740, he made a second tour of Germany, France, Holland, and Italy, and on returning published "Economy of the Animal Kingdom." He resigned the post of assessor in 1747 to devote himself exclusively to the study and advocacy of spiritual things, and was given a pension equal to one half of his salary. Swedenborg claimed a revelation that made it necessary for him to interpret the Word of God according to its true meaning, claiming that he had been in spiritual intercourse with a Divine Being and had been shown the world of spirits. While his eyes were thus opened to the scene of heaven and hell, he claimed to have conversed with acquaintances who had departed from this life as well as with noted men of antiquity. He did not attempt to organize societies, but taught his doctrine in an unassuming but effectual way, gaining large numbers of adherents. However, since his death many societies based upon his teaching have been organized. Among the writings of Swedenborg not mentioned above are "New Jerusalem and Its Heavenly Doctrine," "The Apocalypse Explained," "Heaven and Hell," "Conjugal Love," "Divine Love and Wisdom," "Divine Providence," and, most important of all, "Arcana Coelestia," an exposition of the spiritual sense of the books of Genesis and Exo-



EMANUEL SWEDENBORG

dus. In 1908, his bones were removed to Sweden and placed in the cathedral at Upsala.

Swedenborgians (*swē-dēn-bōr'jā-nz*), or NEW JERUSALEM CHURCH, the followers of Emanuel Swedenborg. The tenets of this religious society embrace the belief that God is a trinity, not of persons, but of principles corresponding to the soul, the body, and the operative energy in man. Heaven and hell are believed to exist in this world as states of the soul, and it is assumed that these states are perpetuated in the spiritual world. Since the soul is thought to have a spiritual existence of its own, the material resurrection of the body is denied. Salvation implies faith, repentance, and obedience to the moral law. It is claimed that the last judgment occurred in the spiritual world in 1757, at which time Swedenborg received a revelation, and the new church then established marks the second dispensation of Christianity. The first Swedenborgian church organized in America was opened at Baltimore in 1792; the present membership is about 10,000. Among the educational institutions is Urbana Junior Coll., Urbana, O. The Swedenborgians are found in Europe as well, primarily in England.

Sweepstake (*swēp'stāk*), a lottery or pool of money usually awarded in horse races. This sum can go either to the owners of the winning horses or to persons who have wagered that specific horses will win. In cases when the sweepstake is awarded to the owners of winning horses the money comprising the stake is donated by the owners of every horse in the race. In cases when the sweepstake is awarded to persons wagering on the winning horses the stake is made up from individual bets, similar to the pari-mutuel system of horse racing in America. The most famous sweepstakes are the annual English Grand National Steeplechase, held at Aintree, and the Irish Free State Hospitals Sweepstakes.

Sweet Alyssum (*swēt ā-lýs'ūm*), a well-

known annual plant (*Lobularia maritima*) having clusters of small fragrant white flowers, grown in greenhouses, baskets, low borders, and window gardens.

Sweet Basil (*swēt bāz'īl*), annual plant about 1 ft. high with oblong or ovate leaves. It is native of the East Indies, cultivated in Europe as a spice.

Sweetbread (*swēt'brēd*), the thymus or pancreas of an animal, usually a calf, used for food; the thymus being the *throat* or *neck sweetbread*, the pancreas being the *stomach sweetbread*.

Sweetbrier (*swēt'brī-ēr*). See *Rose*.

Sweet Flag (*swēt flāg*), the name of a plant found in marshes of the Northern Hemisphere, described in medical works under the name *Acorus calamus*. The leaves are long and slender, the stem is aromatic, and at the upper part of the latter is a greenish spike of flowers. The medical properties, which are derived chiefly from the root, serve as a tonic and a stomachic.

Sweet Pea (*swēt pē*), a flowering plant grown in gardens and parks. The seed is planted early in spring, or in the fall, usually in well-cultivated ground, and is covered with 2 or 3 in. of loose soil. When the plants are about 3 inches high, a trellis is constructed along the rows as a support to prevent them from falling to the ground. The sweet pea blooms early in summer until the beginning of fall, provided the pods are not allowed to ripen. About 100 species have been cultivated for their flowers, which are variegated in colors and highly fragrant.

Sweet Potato (*swēt pō-tā'tō*). See *Potato*, *Sweet*.

Sweet William (*swēt wīl'yam*), the name of a species of pink, cultivated extensively as a flower in gardens. Several species grow wild and bear pale lilac-colored or bluish flowers in spring and early summer. See *Pink*.

Sweyn (*swān*), or SVEND, King of Denmark and father of Canute the Great, born about 950; died in 1014. He invaded England about 1002, when he ravaged a large part of the country, and in 1013 made a second invasion. Ethelred, King of the Anglo-Saxons, was compelled to flee and his country was made tributary to Denmark. Although he proclaimed himself king, his power was not firmly established before his death and the government was left to his son, Canute.

Swift (*swift*), a genus of birds of the swallow family, so called because of their rapid flight. They are widely distributed and include numerous species, most of which are migratory birds. Though the outward appearance is quite like that of the swallow, there is a marked difference in structure. Their flight is more rapid and steady, and they have a scream instead of a mere twitter, while a number of species are larger. They are seldom seen at rest, but remain almost constantly

on the wing. The *American swift* is about 5 in. long and has a wingspread of 12 in. Its color is brownish-black and its nests are built largely near to or on buildings. The *common swift* of Europe is larger than the swallow, its wings measuring fully 18 in when expanded. It is a familiar bird around houses, where it builds a nest of twigs broken from trees, and in many instances utilizes small houses constructed for nesting. Several species of swifts build edible nests, especially those of Madagascar and the East Indies. The *esculent swift*, or *swallow*, is the bird most noted for building edible nests. In this species the female lays two eggs.

Swift, JONATHAN, English clergyman and satirist, dean of St. Patrick's Dublin; born in Dublin, Ireland, Nov. 30, 1667; died Oct. 19, 1745. Swift was educated at the expense of an uncle, Godwin Swift, at Kilkenny School and Trinity Coll., Dublin, but he did not distinguish himself as a student. Upon completion of his education, he became private secretary to Sir William Temple, an outstanding statesman, scholar, and patron of the arts, whose wife was a distant relative of Swift's mother. Swift was also distantly related to John Dryden, who was the dominant literary figure of the day.

In 1697, while living at Temple's estate, Moor Park, Swift wrote his first important work, "The Battle of the Books," in which he supported the cause of the classics in the endless controversy about the relative merit of classical and modern literature. In this controversy, Swift was coming to the support of his patron, who had been criticized for similar views.

Although Swift's official residence was always in Ireland, where he held various ecclesiastical livings, he spent much of his time in London, where he achieved importance and fame as a

JONATHAN SWIFT



writer of political controversy and as a trusted adviser to Lord Oxford and Lord Bolingbroke, the two leaders of the Tory party of the day. Swift hoped through his services to the Tory government and through his intimacy with its leading men to become bishop of an English see. However, Swift never did achieve a bishopric, and tradition says the reason was that his satirical book on religion, "A Tale of a Tub" (1704), had offended Queen Anne. He did, however, become dean of St. Patrick's, Dublin, in 1713.

In 1714, Swift returned to Dublin to take up his new duties. There he became interested in Irish affairs and wrote a series of pamphlets, known as the "Drapier's Letters," attacking the abuses of English rule in Ireland, which made him a popular Irish figure.

Although some critics regard the "Tale of a Tub" as Swift's best work, and although Swift himself seems to have regarded it as his best, "Gulliver's Travels" (1726) is by far his most widely known book. "Gulliver's Travels" is a profoundly satirical study of human nature in which Swift, an advocate of the supremacy of reason over the appetites and passions, arrives at the judgment that man is an animal capable of reason but not likely to use it, and in which he depicts the faults of mankind in the most savage terms. But the savage irony of the book is sufficiently subtle to be easily missed, and "Gulliver's Travels" has therefore become a popular travel-story for children as well as one of the most powerful of English satires.

During a great part of Swift's life, he was subject to almost unbearable headaches. These finally led to madness, and in 1742 he was declared incompetent. Anticipating his madness, he willed his fortune to establish an insane asylum. He also wrote a grimly humorous poem called "On the Death of Dr. Swift" (1731).

Swift probably never married, although some biographers believe him to have married Esther Johnson, a ward of Sir William Temple's, to whom he addressed his famous "Journal to Stella." He was also the object of the affections of Esther Vanhomrigh, a London neighbor and protégée of his own, whose love he did not return. Swift's "Cadenus and Vanessa" is an account of this relationship.

Swift's mastery of irony is unequalled in English literature. The "Tale of a Tub" and "Gulliver's Travels" are the great classics of English satire, but some of his shorter works are equally forceful. Notable among these short pieces are essays entitled "An Argument Against Abolishing Christianity" (1708) and "A Modest Proposal for Preventing the Children of Ireland from Being a Burden to Their Parents or Country" (1729). These two works serve to reveal the temper of his mind and illustrate his literary method.

Swimming (*swim'ing*), the act by which animals propel themselves in water. Quadrupeds actually walk in the water, but this "dog paddle" is too exhausting for man to maintain himself long at the water's surface. He must therefore develop special strokes.

Swimming is one of the most healthful of sports, calling into play almost all the muscles of the body without undue strain. Its importance, both for this reason and for its advantages in specific emergencies, has caused swimming to be adopted as compulsory in the curricula of Scandinavian school systems, a practice followed to some extent in this country. The only serious problem in mastery of the technique of swimming is fear, and this problem is rapidly overcome. It is advisable to begin instruction at an early age. Self-instruction, however, is inadvisable since improper habits may result, difficult to eradicate.

That swimming was one of the first sports indulged in by man can be seen in legends and historical fact. Leander's swimming of the Hellespont must have had some basis in truth, and Julius Caesar is known to have been a good swimmer. The English Channel, long a well-publicized ground for swimming exploits, was first swum by Matthew Webb (1875); the first woman to accomplish this feat was the American Gertrude Ederle (1926). Florence Chadwick, also an American, was the first woman to swim the channel both ways: east to west, 1950, west to east, 1951. Swimming, a popular U.S. sport, has been further popularized by professional swimmers, in exhibitions and in motion pictures—e.g., Johnny Weissmuller, Eleanor Holm, and Esther Williams. See also *Speed Records*.

Swinburne (*swin'bårn*), ALGERNON CHARLES, poet and critic, born in London, England, April 5, 1837; died there April 10, 1909. The son of an admiral and grandson of an earl, Swinburne was educated at Eton Coll. and Oxford Univ., where he indulged his literary tastes by wide reading in English, French, Italian, and classical literature, but where he did not distinguish himself as a student.

Swinburne's various works reveal strong influences from the literature he studied. Some are derivative from Elizabethan drama, some from classical literature, some from Italian, and some from French literature. He was also influenced by the "Pre-Raphaelite movement" (*q.v.*) contemporary with him in English literature. Although Swinburne was not a profound thinker, his originality and importance lay in his experiments in English prosody and in the somewhat revolutionary spirit that pervades his work. These two things made him the object of violent criticism and also brought him many champions among literary people. His friends included Benjamin Jowett,



Courtesy Gramstorff Bros., Malden, Mass.

ALGERNON SWINBURNE

Walter Horatio Pater, John Addington Symonds (*qq.v.*), from his Oxford days; Dante Gabriel Rossetti and Sir Edward Burne-Jones (*qq.v.*), among the Pre-Raphaelites, and Theodore Watts-Dunton, at whose estate he lived for many years. See also *Pre-Raphaelitism*.

Swinburne's first published work appeared in 1860: two dramas entitled "The Queen Mother" and "Rosamond." These publications attracted little attention. He achieved fame, however, with the publication of a tragedy, "Atalanta in Calydon" (1865), and "Poems and Ballads" (1866). These remain among his best-known and most highly regarded works. His other works include other dramas (*e.g.*, "Mary Stuart"), other volumes of lyric and narrative verse, and many critical essays.

Swine (*swin*), or **HOG**, a genus of hoofed mammals. They include species that are highly important for food and other products. The neck is very thick and strong, the head is elongated, the eyes are small, and the nose is slightly truncated. Stiff bristles cover the thick skin of most species. Underneath the bristles are short curled hairs. The feet have four toes, all separately hoofed, but only the two front toes reach the ground. In a wild state the male has enlarged bristles on the back of the neck that form a kind of mane, but this disappears in the highly domesticated species. The tail is short and fleshy. Their food consists of almost every kind of vegetable and animal substances, but in a wild state they cannot be reckoned with the beasts of prey, though poorly fed swine often attack chickens and other small domestic animals. Two or more litters of young are brought forth each year, usually from 5 to 15 in number, thus making them the most prolific of domestic animals.

The domestic hog is a descendant of the wild

SWING

boar, which is still found in some parts of Europe and Asia, but the breeds have been improved remarkably by careful husbandry, making them larger in size, finer in quality, and more docile in spirit. Hogs are clean but savage in the wild state, and in the domestic state conform greatly to their surroundings, being highly clean and quite intelligent under careful treatment. No animal is more important in the productive industries, though hog meat is considered unwholesome in some of the warmer countries. The flesh of hogs was not admissible as a food under the Mosaic law, and it is still prohibited by the Jews and Mohammedans. *Lard* is the fat of the hog rendered under high temperature, and is considered the most valuable of the fats for many purposes. The skin is tanned for use in bookbinding, saddlery, and other leather uses, the bristles are used for brush making, and the hoofs yield mucilage. *Pork* is the name generally applied to the flesh, which is eaten in a fresh or salted state, and is converted to a large extent into bacon, sausage, and hams.

The raising of hogs is a highly important industry in connection with farming. Corn is the favorite food, which is fed either ground or from the ear, but barley, rye, wheat, and other cereals are fed to a considerable extent, though chiefly in a ground condition. The gluttonous disposition of the hog makes it possible to raise herds in rapid succession. They can be marketed when only 6 to 12 months old. The litter brought forth in the spring is the most valuable, as the small pigs can then accompany the sow to pasture, young vegetable growth being highly valuable in addition to milk and cereal food.

Many breeds of hogs are raised in Canada and the U.S. Those raised most extensively include the Poland-China, Chester White, Berkshire, Jersey, Yorkshire, Neapolitan, and Essex. The Poland-China, which is a representative breed, is either black or black with whitish spots, while other breeds are reddish or pure white. Iowa is the greatest hog-producing state in the Union. Others taking high rank are Illinois, Missouri, Ohio, Indiana, Kansas, Nebraska, and Kentucky. The total number of hogs in the U.S. approximates 50,000,000 head. Ontario is the leading hog-producing province of Canada. Hogs are shipped alive to the market, where they are sold to packing houses and butchered, and the meat is prepared for consumption. Among the leading packing-house centers of North America are Chicago, Kansas City, Omaha, Sioux City, Cincinnati, Toronto, and Montreal. See *Meat Packing*.

Swing (*swing*), RAYMOND (GRAM), journalist and radio news commentator, born in Cortland, N.Y., Mar. 25, 1887. Swing served as foreign correspondent in Berlin for the *Chicago Daily News* (1913-17), and the *New York Herald* (1919-

22); he was a reporter in London for the Philadelphia *Public Ledger* and the New York *Evening Post* (1924-34). An editor of *The Nation* (1934-36) and New York correspondent of the London *News Chronicle* (1936-37), he made his first radio news broadcasts in 1935 for the British Broadcasting Corp. He was under contract to the Mutual Broadcasting System (1936-42), when he joined the American Broadcasting Co. One of the most popular of radio news commentators, he has also been praised for his magazine articles and books on current affairs.

Swinton (*swin'tūn*), WILLIAM, author, born in Salton, Scotland, April 23, 1833; died in Brooklyn, N. Y., Oct. 24, 1892. When he was 10, his family emigrated to Montreal, Quebec, and he later attended, briefly, Amherst Coll. In 1853, he became a teacher, at the beginning of the Civil War became field correspondent of the New York *Times*, and afterward devoted himself to writing textbooks.

Swiss Guard (*swīs gārd*), a famous regiment organized in France (1616) and composed exclusively of Swiss. During the Revolution of 1789 this regiment remained loyal to the government, but on Aug. 10, 1792, while defending the Tuileries against a mob, they were overwhelmed and some 800 of their number fell. Their memory is honored by Thorwaldsen's "Lion of Lucerne," cut in a cliff at Lucerne, Switzerland. In 1815, Louis XVIII made an effort to revive the Swiss Guard, but the body was deactivated in the Revolution of 1830.

The term Swiss Guard is today applied to the papal guard which represents the military force of the Vatican. Maintained principally for purposes of representation, the Swiss Guard acquired

a new significance during World War-II, when the protection of Vatican property became necessary during the battle of Rome in 1944.

Switch (*swich*), in electricity, a device for connecting and disconnecting electrical circuits. It usually consists of a set of contacts with a movable blade which may be made to touch the contacts. Switches are classified according to the number of blades and the number of positions into which the blades fit. Thus a double-pole switch has two blades, while a double-throw switch has two positions of the blade. In *rail-roading*, a switch is a device, consisting usually of two movable rails, designed to turn a locomotive or train from one track to another.

Switchboard (*swich'bōrd*), a collection of electrical switching devices and indicators mounted upon panels for observing the condition, and controlling the operation, of a system of electrical circuits. In *telephony*, the switchboard resembles a cabinet in which are mounted lamp signals and switching devices by which telephones may be interconnected. The first commercial telephone switchboard was introduced on Jan. 28, 1878, at New Haven, Conn., and the first "multiple" switchboard was opened in Chicago in the following year. Since, in the multiple switchboard, each subscriber's line is "multiplied" or duplicated on every section of the board, the operator can connect one subscriber's line with any of the other lines which terminate at her switchboard. In the larger cities manual switchboards accommodate as many as 10,000 subscriber's lines. In the dial system switching equipment, performing functions similar to those of the manual switchboard, makes telephonic connections automatically. As the caller dials each digit or letter of the number called, the dial swings back with a certain number of clicks, causing impulses to be sent through an electromagnet in the central office, where apparatus automatically places the call.

In *electricity*, a switchboard is a control board for the generation and distribution of electricity. It consists of a single panel or many panels ranging in size from about one sq. ft. for the control of a small farm lighting generator to many panels several hundred sq. ft. in area for a large generating or substation (used for distributing electricity). Upon these panels are mounted the controlling devices such as switches, fuses, circuit breakers and measuring instruments. The panels are identified according to the equipment they control such as generators, feeders, batteries, power, or lighting.

Switzerland (*swit'zēr-land*), in German, *Schweiz*, a federated republic of Central Europe located between 45° 50' and 47° 50' N. latitude and 5° 48' and 10° 28' E. longitude. It is bounded on the N. by Germany, E. by Austria, S. by Italy



Courtesy Swiss Federal Railway

SWITZERLAND

and France, and w. by France. The length from east to west is 208 m. and the width is 128 m. The Jura Mts. form the natural boundary between Switzerland and France, and the southern boundary is mainly the Alps, but the other borders do not conform to natural features. The total area is 15,944 sq. m.

DESCRIPTION. The surface is diversified by lofty ranges, beautiful lakes, extensive glaciers, and fertile valleys. Both the Alps and the Jura Mts. traverse various sections, the former largely in the south and the latter along the western boundary. The Alps separate the country from Italy, and it is in this region that they reach their highest altitudes in Mont Blanc, Monte Rosa, and the Jungfrau, which lie on or near the border. The general elevation of the Alps in Switzerland ranges from 6,000 to 9,000 ft. The highest peak is Monte Rosa, height 15,217 ft. Peaks of considerable altitude occur in the Jura Mts., this chain being linked to the Alps by a range called the Jorat, but they do not exceed 5,505 ft., which is the elevation of Mont Dôle, the highest of this range in Switzerland. The snow line is about 9,250 ft. above sea level, and therefore Switzerland has a large area of perpetual snow. Much of the central part of the country is a plain, with an elevation of 1,300 ft. above the sea.

The rivers are not large, but they are important as sources of water power. They are well supplied with water during the entire year, since the melting snow of the Alps feeds them during the period when rainfall is not abundant. Many of the important rivers of Europe have their source in Switzerland, including the Po, the Rhine, and the Rhone. The Rhine and its tributaries furnish the greater part of the drainage. The swiftness of the streams makes them almost useless for navigation. The Aar, a tributary of the Rhine, is navigable by vessels of considerable size and carries a larger volume of water to their junction than the Rhine itself. Lake Geneva is entered by the Rhone, which carries the overflow across the border into France. The Ticino, a head stream of the Po, crosses the border into Italy. Considerable drainage is carried by the Inn to the Danube, which it enters at Passau, where it discharges a larger volume of water than the Danube itself. Lake Constance, in the northeastern part, is partly in Germany. The largest body of water within the country is Lake Geneva, on the southwestern border. Other lakes include Zürich, Thun, Lucerne, Neuchâtel, Brienz, Bienne, and Maggiore. The interior lakes belong to the Rhine basin, while Lake Geneva is drained by the Rhone, and Lake Maggiore, partly in Italy, has its outlet through the Po.

The climate varies according to altitude and



Photo by A. Steiner, St. Moritz

ST. MORITZ, SWITZERLAND

proximity to the snow-capped mountains, but all sections are healthful and agreeable. A temperate climate prevails on the central plain and in the valleys, where the mean annual temperature is about 50°. With every thousand feet of ascent the temperature diminishes three degrees, and so the elevated valleys have a severely cold atmosphere in winter. Clouds hover over the higher Alps most of the time, and here the rainfall ranges from 70 to 90 in. In the central plain the rainfall is 30 in. A warm wind from the south, called the *Föhn*, frequently causes a rapid melting of the snow and consequently inundations and avalanches.

MINING. The mining industry is not sufficiently productive to supply the demand for the more important minerals. At Bex, Schweizerhall, Rheinfelden, and Ryburg, salt is mined. The yearly output amounts to about 790,000 quintals. Iron ore and manganese are mined in the province of St. Gall.

AGRICULTURE. About 20 per cent of the population is engaged in agriculture. The farms number about 250,000, but 25 per cent of the total acreage is unproductive. Forest lands cover almost 23.8 per cent of the area. Wheat is an important crop. Others include potatoes, sugar beets, vegetables, tobacco, apples, and pears. The grape industry is well developed in all the cantons, but the best wine is obtained from Geneva and Neuchâtel. Almonds, chestnuts, olives, and lemons are grown in the warmer cantons of the south, where the hill-sides are dotted with fine orchards. Gardening and flower-growing receive considerable attention.



Courtesy Swiss Federal Railway

MOUNTAIN CLIMBING IN THE SWISS ALPS

Much progress has been made in cultivating the mulberry tree and silk-worms. Cattle raising and dairying are highly developed and Swiss cheese is exported to all parts of the world. Other domestic animals include horses, sheep, goats, swine, and poultry. Switzerland is visited annually by many tourists, making it necessary to import large quantities of meat. The lakes and rivers abound in fish. Lands that are used for grazing are partly timbered, but fine forests are found in some sections; forest trees include beech, walnut, maple, oak, and pine.

MANUFACTURE. Switzerland has extensive manufactures, although it has no seaports and only limited coal and iron resources. The government has given encouragement through the maintenance of industrial and technical schools to the dissemination of knowledge in the fields of mining, dairying, agriculture, and architecture. Ample water power is furnished by the streams. The manufacturing centers are near the markets of adjoining countries where raw materials can be obtained and the finished products may be sold. Textiles and metal products are of first importance, and in the quality of lace and embroidery the country is unexcelled. Basel is the center of the silk industry, and large quantities of dress goods are woven at Zürich. The manufacture

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of clocks and watches is a leading industry. Other manufactures include musical instruments, pottery, tobacco products, sugar, jewelry, leather, and machinery. Canned milk and fruits, wine, and cheese hold a high place in the list of manufactures.

COMMERCE AND TRANSPORTATION. Switzerland occupies a singular position commercially, since it has a large foreign trade in spite of the fact that it produces insufficient quantities of nearly all of the raw material to supply the demand. It exports large quantities of cotton and silk textiles, lace and embroidery, wine, cheese, jewelry, and watches. The imports consist principally of coal, raw cotton, grain, iron, and petroleum. Trade is principally with France, Great Britain, and the U.S.

The country has excellent highways, extensive canal facilities, and 3,218 m. of railroads. There are 1,788,760 m. of telephone and telegraph lines in the country. Connection by railway is made with Italy through the St. Gothard and the Simplon tunnels. The lakes are important for navigation. A considerable harbor is maintained at Basel, whence shipments are made via the Rhine to Cologne and other points.

GOVERNMENT. Legislative authority is vested in a parliament of two chambers: a council of states and a national council. The former consists of 44 members, elected and paid by the 22 cantons of the Confederation. The canton is responsible for the mode and term of the membership. The national council comprises 196 representatives, chosen for a four-year term. Chief executive authority is vested in a seven-member federal council, elected for a four-year term by the federal assembly (a joint meeting of the two chambers of parliament). The first magistrates of the Confederation are the president and the vice president, elected by the federal assembly for a period of one year. Local government is vested in the cantons and demicantons (totaling 25), which have independent legislative powers not assumed by the federal constitution. The right to vote is restricted to male citizens.

Service in a national militia is compulsory between the ages of 20 and 60 years. In peacetime, the Swiss militia numbers *ca.* 46,000 men. World War II brought about the mobilization of 650,000 men.

EDUCATION AND RELIGION. Free primary schools are maintained in every district. There are also a large number of secondary schools as well as commercial, technical, agricultural, and other schools which provide special education. Institutions of higher education include the universities of Berne, Geneva, Zürich, Basel, Fribourg, Lausanne, and Neuchâtel, which attract students from all parts of Europe. Zürich also has a federal polytechnic school. Freedom of worship is extended to all the sects. A large majority of the people (*ca.* 56 per cent)

are Protestants; 41 per cent are Roman Catholics.

POPULATION. The inhabitants of Switzerland were known to the Romans as Helvetians. These people were of Celtic origin and were later influenced by the Rhaetians and the Teutons, the latter becoming dominant. German, more specifically a Schwyzer-Dütsch dialect, is the prevailing language and is spoken by ca. 3,500,000 Swiss citizens, while the remainder use the French, Italian, and Romansch languages, the latter being a form of Latin, called Rhaeto-Roman. Berne (Bern), on the Aar, is the capital. Other cities include Zürich, Basel, Geneva, Lausanne, Saint-Gall (St. Gallen), and Lucerne. Population, March 1956 (est.), 5,001,000.

LITERATURE. Swiss literature throughout the ages reflects a deep consciousness of history; it is a literature more preoccupied with the pragmatic problems of the rulers and the ruled than with the lyrical expressions of the lovers and the loved. Among the great Swiss writers we find statesmen rather than philosophers, epic poets rather than lyric bards, plain narrators of unassuming tales rather than subtle craftsmen of complex novels. Breitingen, Gessner, Bodmer, Haller, and Hirzinger are among the famous names of the growing nation.

Jacob Burckhardt created a special place for himself as his country's most eminent scholar, historian, and man of letters. In Carl Spitteler's works the epic element of the Swiss tale reached its highest perfection; Gottfried Keller and Konrad Ferdinand Meyer were among those writers whose fame spread beyond the borders of their country. The new Switzerland is represented by those who have merged the strands from the world "beyond the Rhine" with those of the native tradition—Meinrad Lienert, Simon Gfeller, Josef Reinhart, Traugott Meyer, Otto Eberle, and Otto von Greyerz, most of whom wrote in home dialect (Schwyzer-Dütsch).

HISTORY. The region now included in Switzerland was populated at the beginning of the historical period of Western Europe by the Helvetians in the north and the Rhaetians in the south. Both became subject to the Romans about 58 B.C., under whom they remained until about 215 A.D. Incursions were made by the Alemanni, who joined Switzerland to the German Confederation, and later settlements were formed by the Burgundians and Goths. Subsequently the Franks under Clovis made a number of settlements, and the whole region came under Frankish control in 534. Christianity was introduced among the Burgundians in the 5th century, but the Helvetians remained pagan until the 7th century. Switzerland was a part of the Frankish empire under Charlemagne, but his successors annexed a part to France and a portion to Germany, and early

in the Middle Ages the entire region was united to the German Empire. Feudalism was introduced soon after, and the counts were only in part dependent upon the German emperors. A series of civil wars secured the freedom of several cantons and special charters for many of the towns. The counts of Hapsburg, secured possession of Unterwalden, Uri, and Schwyz, three of the forest cantons, in the early part of the 13th century, and assumed the right to govern as sovereign rulers.

In 1291, however, these three cantons formed their *Ewiger Bund* (perpetual pact), the foundation-stone of the Swiss Confederation, to preserve local self-government and gain independence. Tradition says that 31 representatives met at night in a solitary spot near Lake Lucerne, where the compact was subscribed to and those interested were bound by oath to its observance. The leaders chosen were Stauffacher of Schwyz, Arnold of Unterwalden, and Furst of Uri, with his son-in-law, William Tell. These leaders aroused the peasants to the duty of maintaining their freedom and independence and expelled the Austrians. An invasion under the Austrian counts followed, but the Swiss defeated them with great loss at Morgarten in 1315, thus securing the independence of the three cantons. They annexed the city of Lucerne in 1332, Zürich in 1351, the cantons of Glarus and Zug in 1352, and Bern in 1353. Austria claimed the cantons of Glarus and Zug and the city of Lucerne, and accordingly invaded Switzerland. The Austrians were defeated by the Swiss under Arnold von Winkelried at Sempach in 1386.

The Swiss became aggressive in 1415 and invaded Aargau and Thurgau, territory belonging to Austria, and won the resulting war. They secured the cession of these regions by a treaty in 1460. Freiburg and Solothurn were admitted into the confederation in 1481, as the result of a successful war against Charles of Burgundy. Emperor Maximilian I of Austria made a final attempt to bring the Swiss into subjection in 1498, but met defeat in six battles, and the Peace of Basel of 1499 gave Switzerland practical independence, though international sanction was not secured until 1648. The cantons of Basel, Schaffhausen, and Appenzell were long sympathetic allies to the confederation; the two former were annexed in 1501 and the latter in 1513, bringing the number of cantons to 13.

Zwingli began to preach the Reformation at Zürich in 1518, and his religious tenets were adopted by that canton in 1523. Bern and the other northern cantons soon followed, though the forest cantons remained attached to Catholicism. In 1531, war broke out between the two factions and Zwingli was slain at the Battle of



Photo by A. Steiner, St. Moritz

LOTSCHEN VALLEY, SWITZERLAND

Kappel. The work of the Reformation was soon taken up by Calvin at Geneva, but struggles and internal dissensions prevailed for centuries. The Protestants won a final victory, in 1712, at Villmergen. Public thought began to turn toward internal development, resulting in the construction of canals, the building of cities and schools, and the development of a national spirit, law, and literature. The French seized Switzerland in 1798, when a number of cantons were added, but the treaty of 1815 again restored independence and brought the number of cantons up to 22. This treaty was made at Vienna and declared the perpetual neutrality of Switzerland and parts of North Savoy under the guarantee of the great powers, who pledged themselves to maintain Swiss independence. The order of Jesuits was expelled in 1847, and the next year a number of disturbances occurred as a result of the Revolution of 1848 in France. This resulted in the adoption of the constitution of 1848, which forbade many religious practices in Neuchâtel and other cantons.

The present constitution of Switzerland is a revision made in 1874. It accords greater power to the Federal authorities, guarantees a larger scope of political rights to the citizens, and extends the suffrage. The 600th anniversary of the Swiss republic was celebrated in 1891, thus giving it the proud distinction of being the oldest of existing governments based directly upon democracy and the common rights of all. Switzerland has made material progress in its commercial and industrial life since the latter part of the 18th century, and the government is continually exercising its offices to extend this commercial and material impor-

SYBARIS

tance. Although the history of the country has been comparatively uneventful during the past century, it has been marked by a steady intellectual and national growth. Reforms in labor laws and insurance for the working classes were adopted about 1910. Switzerland remained neutral during World War I. Following the war the League of Nations was established in Geneva. During World War II, the country again remained neutral, serving many humanitarian interests. Beginning in 1948, Switzerland participated in the European Recovery Program (*q.v.*).

Sword (*sôrd*), a weapon of offense or defense, used either as a dagger or a knife. It is a long steel blade fitted with a handle large enough to grasp with one hand, or, in some cases, with both hands. The blade is larger than that of a dagger or poniard, and heavier than that of a rapier (*q.v.*). The length of the blade varies from 30 to 35 in., which is about the length of a *saber*, a weapon formerly used by cavalry for cutting and thrusting. The sword went rapidly out of use after the invention of modern weapons. Swords made of bronze and later of iron were used in ancient Greece. Tempered steel was used in making the straight swords employed in Rome at the beginning of the Christian era. See also *Damascus Steel*.

Swordfish (*sôrd'fish*), a family of spiny-rayed fishes, allied to the mackerels. They attain a length of 15 ft. and have the bones of the upper jaw consolidated to form a long, swordlike process. Swordfish are widely distributed in the open seas of tropical and subtropical climes, and, being quite strong and swift, the larger species are rarely captured. The ventral fins are absent and the dorsal fin is high, without distinct spines. Only a few species are known. Most of those caught are bluish-black above and silvery-white beneath. They pursue schools of mackerel and other fishes, and feed on them avidly. The swordlike projection forms about three-tenths of their length and is used as a weapon. They have been known to pierce the timbers of ships with these projections and to kill large-sized whales. Young swordfish are considered good food, both fresh and salted, but when older the flesh becomes less palatable. These fishes are abundant off the Atlantic shore of North America and in the Mediterranean, and in the latter are harpooned by fishermen of Sicily and Naples. Those native to the Mediterranean are spoken of as *common swordfishes*. They attain a length of 10 to 20 ft.

Sybaris (*sîb'â-rîs*), a city of the ancient Greeks in Lucania, in the southern part of Italy. It was situated on the west shore of the Gulf of Tarentum, between the Crati and the Coscile Rivers, a short distance from the sea. The Achaeans founded it about 720 B.C., but other nationalities were permitted to take part in its government.

SYCAMORE

According to Strabo, the city reached its height of prosperity about the year 500 B.C., when it ruled over 25 subject cities and sent an army of 300,000 men into the field. It carried on a large trade with centers in Europe and Asia Minor, but finally fell into the hands of Telys, a tyrant supported by the popular party. The Crotonians destroyed the city while it was in the height of its prosperity.

Sycamore (*sik'â-môr*), the name applied to a species of maple trees. It occurs in abundance in the west central part of North America, especially in Ohio and Indiana, where it is frequently called the *plane tree*, or *buttonwood*. The leaves are broad and the bark is white.

Trees of this species are wide-spreading, the top often occupying a space 40 yds. in diameter. They are planted near villages and along highways for shade and ornamental purposes.

Sycamore is properly the name of a large tree native to Syria and Egypt, which is allied to the common fig. This tree yields a small fruit which is used extensively in Egypt for food, and the wood, though light and soft, is very durable, having been used for the coffins of mummies. The fruit is top-shaped, well flavored, and somewhat aromatic.

Sydney (*sîd'nî*), a seaport city of Australia, capital of New South Wales, the oldest and largest city in that continent. It is also the fourth city in the British Empire. It occupies a convenient site on Jackson Bay, an inlet from the Pacific Ocean, on which it has a large and well-improved harbor. The Sydney Harbor Bridge is the largest arch bridge in the world. In 1945, the Captain Cook Graving Dock was opened. An 80,000-ton liner could be floated in the dock for complete overhaul. An extensive system of railroads furnishes communication with the regions lying inland, thus giving the city important domestic and foreign trade advantages. Among the notable buildings are the post office, the government house, the parliament building, the custom house, the Cathedral of St. Andrew (Anglican), the Cathedral of St. Mary (Roman Catholic), the National Art School, and the public library. It is the seat of the Univ. of Sydney, several hospitals, and a number of industrial institutes. Taronga Park, with its zoological gardens and aquarium, is one of the show places of Australia.

Sydney is important as an industrial center. It has large flour mills, lumber yards, grain elevators, and railway shops. Manufactures include machinery, glue, leather, cured meat, vehicles, boots and shoes, sugar, paper, furniture, hardware, glass, pottery, steam engines, and clothing. It has a large export trade in coal, preserved meat, wool, wheat, copper, hides, tallow, and tin. The imports include coffee, tea, cotton, wearing apparel, and other goods. The place was founded in 1788. It was named in honor of Lord Sydney, the British



Courtesy Australian News & Info. Bureau, N. Y.

HARBOR OF SYDNEY, AUSTRALIA

home secretary. Its prosperity dates from 1851, when gold was discovered in the region lying inland, but it has been largely augmented by railroad building and the establishment of manufactures. Population *ca.* 1,400,000.

Sydney, county seat of Cape Breton County, Nova Scotia, 200 m. N. E. of Halifax, on Cape Breton Island. It is on the Intercolonial Ry., and in the vicinity are extensive coal mines. The harbor is safe and commodious. It is the terminus of lines of steamers reaching Halifax and other cities. The industries include meat packing, machine shops, shipbuilding, and steel and iron works. Among the noteworthy buildings are the public library, the county courthouse, the Sydney and the Grand hotels, and a number of churches. Population, *ca.* 30,000.

Syllable (*sîl'a-b'l*), in philology, a unit of one or more letters which form one sound and are part of a word.

Syllabus (*sîl'â-bŭs*), an outline or abstract of the main points of a topic or book. In the Roman Catholic Church, a syllabus refers to a list of errors condemned by the Pope, such as the *Syllabus Errorum*, a document published by Pope Pius IX in 1864. The word is also applied to an outline course of study, such as those published by State education departments for use by teachers.

Syllogism (*sîl'ô-jîz'm*), in logic, the principal method of deductive inference, that is, an inference from the general to the particular. It contains three terms, the *subject* and the *predicate* of the conclusion, and a term called the *middle term*, which occurs in both premises. The syllogism has three propositions, namely, two premises and a

conclusion. The premise containing the major term is called the *major premise*; the major term is the predicate of the conclusion. On the other hand, the premise containing the minor term is called the *minor premise*; the minor term is the subject of the conclusion. The following arrangement is in the regular form of deductive reasoning:

All men are mortal.

John is a man.

Hence, John is mortal.

It will be seen that the first two propositions, called the premises of the reasoning, or syllogism, make the proof of the third, while the third proposition, called the *conclusion*, is the point to be proved. The arrangement may be expressed in the formula: "*M is P, S is M, therefore S is P.*" Premises may be negative as well as affirmative, that is, *S is not P*, as well as *S is P*, and they may include either all or a part of the subject, as some *S is P*, or some *S is not P*. From these we have the four cardinal propositions:

Universal affirmative: All *S is P*.

Universal negative: No *S is P*.

Particular affirmative: Some *S is P*.

Particular negative: Some *S is not P*.

The four cardinal propositions, as a matter of convenience, are designed by the first four vowels: namely, *A*, universal affirmative; *E*, universal negative; *I*, particular affirmative; *O*, particular negative. In combining these four propositions in all the possible ways of three in a set, we obtain 64 sets, which are called *moods*. However, only 11 of these moods give valid conclusions, namely, *AAA, AAI, AEE, AEO, AII, AOO, EAE, EAO, EIO, IAI, and OAO*. Every mood of the syllogism has four figures. In the first figure, the middle term is the subject of the major premise and the predicate of the minor; in the second, the middle term is the predicate of both premises; in the third, it is subject of both premises; and in the fourth, it is the predicate of the major premise and the subject of the minor. Since each of the 11 moods has four figures, it follows that there are 44 syllogisms, but of these only 19 are found by examination to be distinct and valid.

When one of the premises is understood but is not expressed in the statement, the syllogism is called an *enthymeme*. When several premises are employed for the same conclusion, several syllogisms are in fact abridged into one formula, which is called a *societas*. When one premise is assumed as hypothetically true and the conclusion is stated as depending upon the truth of the other alone, we have what is called a *conditional judgment*. On the other hand, if the conclusion is stated as depending upon the falsity of the other, we have a *disjunctive judgment*. Besides the fulfillment of all the conditions of the formulas in syllogisms, it is necessary to observe

certain conditions and laws in regard to the use of words, this being necessary to the validity of the reasoning. A violation of these laws gives rise to fallacies.

Sylvester (*sil-ve's-tēr*), the name of two popes and an antipope. *Sylvester I* was elected pope in 314 and governed the church during the reign of Constantine I. He sent two legates to represent him at the Council at Nicaea and exercised much influence over the emperor. He died in 335, having served about 21 years. *Sylvester II* became pope in 999, at the advanced age of 64 years, and died in 1003. His name is associated with progress in scientific studies, especially in astronomy, mechanics, and mathematics. The superstition of the times caused people to look upon him as a magician, and there was a popular belief that his soul had been sold to Satan. *Sylvester III* was the antipope of Gregory VI, but was deposed in 1046 by the Synod of Sutri. See *Pope*.

Symbol (*sim'būl*), a term, taken from the Latin *symbolum*, "sign," meaning a sign which does not depict exactly but represents, which is not descriptive but has meaning through association, e.g., the cross for Christianity, the U.S. eagle, the heart for love, the olive branch for peace. Such symbols have always been especially common in all religions, but they appear also in the anonymous traditional folklore of all peoples and races.

Certain communities are actually held together by a common use of identical symbols, i.e., signs with which only the members connect a certain meaning and sense. Symbols even play a role in private relations. A shell may become a symbol for two lovers because it reminds them of their common experiences at the beach. Flags, banners, decorations, and orders are symbols for the spirit of specific units of the armies of all nations of all times. Thus, the scarab is a symbol of the Egyptian, the eagle of the Roman legions.

The picture writing of the ancient Egyptians and the development of hieroglyphics are also symbols. Eventually the whole Egyptian alphabet was developed out of symbols which had begun as pictures of concrete objects; and we find corresponding transitions from pictorial to symbolistic forms in Chinese characters and those of many other peoples.

Even our language, in its figures of speech, is full of symbolic expressions, which are generally understood for what they actually mean and are not conceived of as what they really say. In the expressions as "to separate the wheat from the chaff," "to throw out the baby with the bath water," no one is thinking of chaff or of babies, but only of the meaning of what the phrase actually represents.

Originally, the Egyptians symbolized their gods through and as animals. Later, attributes of

the gods became symbols of their qualities, *e.g.*, the winged disk of the sun became the symbol of the victory of the good over the evil. In the same way, the lamb in Christianity later became the symbol for the sacrificial death of Christ. Oriental religions and philosophical systems were always inclined to symbolize ideas through abstract signs rather than to depict them realistically, and much of this tendency was later preserved in the teachings of the Christian church. One example of pre-Christian symbolism is the symbolism of numbers which we find throughout the whole Orient, but also in Jewish and Greek thought. Many of these numbers, such as the sacred seven of the Jews, were later taken over by Christianity, but with a different meaning.

In religion, the symbol is a sign which directs our reactions toward the real meaning of the whole structure of the belief. Thus, a cross means not only the wooden beams on which Christ was crucified, but the whole mystical, emotional, and ethical content of Christianity. Contrariwise, the grape, originally a symbol of fertility and abundance, becomes in Christianity the symbol of the Christian hope of heavenly reward. In the same way as Christianity took over the old sacred seven of the Jews and made it the seven last words of Christ, the seven sacraments, the seven words of charity, etc., the ancient Oriental animalistic symbolism was changed in the Middle Ages. Certain animals became representatives of specific qualities, *e.g.*, the lion of courage, the lamb of humility, the peacock of conceit. These meanings were generally understood, but in addition some animals also had specific symbolic connotations, *e.g.*, the evangelical symbols, the winged lion of Mark, the winged ox of Luke, the eagle of John, the winged man of Matthew. A similar symbolic character was also given to certain plants. There is also a color symbolism, *e.g.*, the white of innocence, the green of hope, the blue of loyalty, the red of love, and from this, canonical rules for the colors used in the depiction of the Virgin Mary and the saints in medieval art developed. Thus, throughout the whole western world secular and sacred symbols are inseparably interwoven.

However, symbolism is by no means only a phenomenon of religion. Countless examples prove that symbols are used in daily life, and new ones originate daily. A road sign with a cross on it indicates a crossroad ahead; a skull and crossbones on a medicine bottle means poison; wings on a soldier's shoulder patch mean he is connected with the Air Forces. The development is always the same: first the real thing is depicted to signify a certain object, then this depiction is simplified so that it is only just recognizable, a kind of shorthand abbreviation, and in this form it finally means not only the original object but the action, the ideas, the associations connected

with it. Many symbols become a part of folklore and are understood not through a vague remembrance of original forms but merely by tradition. These symbols differ from country to country. Two American examples are the Indian before the tobacco store and the red, white, and blue revolving pole before the barber shop.

Symbol, a sign used in various sciences. Symbols are used in *mathematics* to represent a quantity or an operation, or to express relationship between two or more quantities. In *chemistry*, symbols are abbreviations standing for the name of an element, and consist of the initial letter of the Latin name, or sometimes of the initial letter of the name of an element. In *astronomy*, symbols are used to indicate the signs of the zodiac and the phases of the moon. For instance, ☾ indicates new moon; ☾, the first quarter; ☽, full moon; and ☾, the last quarter. See *Arithmetical Signs; Atomic Weight; Chemistry; Zodiac*.

Symbolism (*sim'būl-iz'm*), the theory and explanation of the symbols of a specific civilization. Thus we speak, for example, of Christian symbolism, the branch of Christian theology which deals with the symbols of the Christian church and their various explanations. The mysteries of the Christian church are deposited in symbols which need to be explained, and there is a tremendous theological literature of what are called symbolic books. Medieval Christian symbolism tried to crystallize the cosmic order in scriptural numbers. Certain instruments of torture became the attributes of certain saints and actually their symbols or even the symbols for specific ideas for which they stand. The fish became the symbol of Christ because the letters of the Greek word for fish, *ichthys*, made the first letters of the name of Christ, *Iesus Christos Thei Hyjos Sother* (Jesus Christ, God's Son, Savior).

Symbolism also refers to a period of late 19th century literature which tried to represent spiritual values by means of abstractions.

This movement in literature began with Charles Baudelaire (1821-67), who walked "through a forest of symbols," and in his footsteps followed such men as Jean Arthur Rimbaud (1854-91), probably the greatest of the late 19th-century Symbolist authors, and Paul Verlaine (1844-96), more popular but not so strong as Rimbaud. Stéphane Mallarmé (1842-98) belonged to the same group.

In contrast to this group, Maurice Maeterlinck (1862-1949) and Emile Verhaeren (1855-1916) are, intrinsically, not symbolists, although often labeled as such. In Great Britain, a corresponding trend appears, especially in William Butler Yeats (1865-1939) and some Irish playwrights, and in Russia to a certain degree in the work of Anton Chekhov (1860-1904). Recently, the writings of James Joyce (1882-1941), Eugene O'Neill (1888-

1953), and Jules Romains (born 1885) still show strong influences of this movement.

Symbolism also plays a special and important part in the theories of Sigmund Freud (*q.v.*). Freud believed that he had discovered that certain tendencies and trends of the subconscious (*q.v.*) manifest themselves in certain concrete objects in free association and in dreams. Water, for example, is always connected with associations of the prenatal state, the serpent with the phallus, etc. In other words, Freud believed that from the time of the origin of mankind, in archaic totems as well as in the symbols of more highly developed religions, natural objects, by reason of past experiences, are identified with certain ideas. These symbols are, in Freud's opinion, universal. Only their pictorial appearance changes within certain limits.

Symington (*sî'mîng-tûn*), WILLIAM STUART, U.S. Senator, born in Amherst, Mass., June 26, 1901. He served in the Army in 1918 and studied at Yale Univ., 1919-23. After a successful business career, he entered government service in World War II. At first he held various consultative positions, and, in 1945, he became the head of the Surplus Property Admin. In 1946 he was appointed Assistant Secretary of War for Air, and, in 1947, he became the first secretary of the newly created U.S. Air Force; in both positions he emphasized the importance of strategic bombing. Symington resigned as secretary in 1950 to become chairman of the National Security Resources Board, and from 1951 to 1952 he was administrator of the R.F.C. In the latter year he was elected to the Senate (from Missouri).

Symmes (*sîmz*), JOHN CLEVES, pioneer, born on Long Island, N.Y., July 21, 1742; died in Cincinnati, Ohio, Feb. 26, 1814. In 1787, he formed an association to colonize a tract of land along the Ohio and Miami Rivers, for which purpose he obtained a grant of 1,000,000 acres of land. The first settlement was made by a company from New Jersey, which settled the town of Losantiville, but the name was later changed to Cincinnati by Gov. St. Clair. As Symmes failed to colonize all the land granted, the tract was reduced to 238,540 acres. The *Symmes purchase*, as the tract was called, was instrumental in causing the passage of the first pre-emption (*q.v.*) law in 1801.

Symmetry (*sîm'ê-trî*), in mathematics, a term pertaining to geometric figures in which each point of the figure has a corresponding point symmetrical to it. Two points are symmetric to a line, called the *axis of symmetry*, if the line is the perpendicular bisector of the line segment joining the points. Two points are symmetric to a third point if the point is the bisector of the line segment joining the two points.

Symmetry in art means the arranging and distributing of the single elements of a work of art along an axis or around a center, so that on both sides equal or similar parts correspond.

The term symmetry is also used in music to indicate equal length and similar construction of corresponding phrases or measures.

Symonds (*sîm'ûndz*), JOHN ADDINGTON, historian, born in Bristol, England, Oct. 5, 1840; died in Rome, Italy, April 19, 1893. The most noted of his publications is "Renaissance in Italy," a work of seven volumes (1875-86). He spent the last 20 years of his life at Davos Platz, a health resort in Switzerland, where he wrote his later works, among them a translation of the "Autobiography of Benvenuto Cellini" (1888).

Symons (*sîm'ûnz*), ARTHUR, poet and critic; born Feb. 28, 1865, in Wales; died Jan. 22, 1945, in Kent, Eng. His first volume of poetry, "Days and Nights," appeared in 1889. This and succeeding volumes ("Silhouettes," "London Nights," "Images of Good and Evil") were finally brought together in "Collected Poems" (1901). His critical prose, in addition to pieces for the *Athenaeum* and the *Saturday Review*, included studies of Browning (1886), Baudelaire (1921), and Hardy (1927), and such historical literary studies as "The Symbolist Movement in Literature" (1899), "The Romantic Movement in English Poetry" (1909), and "Studies in Elizabethan Drama" (1920). His "Confessions" (1930) described a period in which he suffered temporarily from insanity. A follower of Baudelaire and a member of the Symbolist movement, Symons will perhaps be remembered not so much as a poet as an intellectual leader of the literary *fin de siècle* (*q.v.*).

Symphony (*sîm'fô-nî*), an elaborate instrumental composition in three or more movements, similar in construction to a sonata, but written for an orchestra. It is considered the most highly developed form of instrumental music. Haydn brought the symphony to its classical form in the 18th century, and since then it has been developed extensively by Beethoven, Brahms, Mendelssohn, Mozart, Schumann, and later composers. See also *Music*.

Symptoms (*sîmp'tûmz*), in medicine, the phenomena from which are inferred the existence and the nature of disease. Symptoms may be perceptible to the patient, as in the case of pain, or they may be obvious, as in the case of discoloration. Those manifestations of disease which are apparent to the examiner without description by the patient are called *signs* of disease. Symptoms vary according to age, sex, mode of living, etc., and what might appear as a symptom of a certain disease in one person might occur as a symptom of something else in another person. A complex of symptoms characteristic of a particular

SYNAGOGUE

disease is called a *syndrome* in medical language.

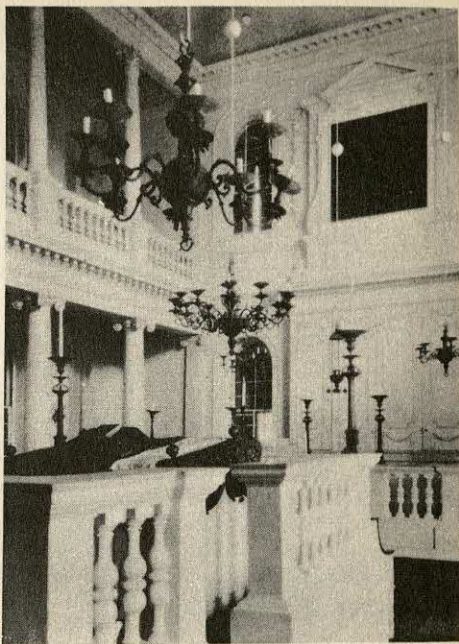
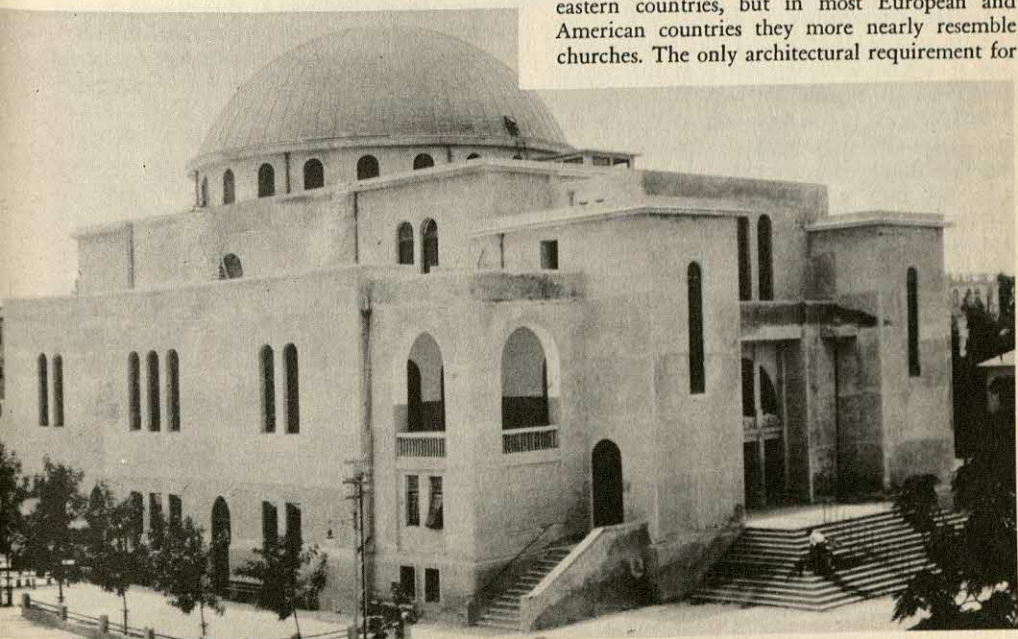
Synagogue (*šin'â-gôg*), from the Greek meaning "assembly," a place of meeting for Jewish worship and religious instruction, which corresponds to a church used by Christians for a like purpose. Jewish worship of the highest type was limited by the Mosaic law to the divinely chosen Jerusalem, but gatherings were held in various localities, even in the early period of the monarchy. When the Israelites were exiled in captivity to Babylonia, they constructed synagogues there. Buildings of a similar character were constructed after the return from captivity and soon dotted all the inhabited parts of Palestine. It is mentioned specially in the Bible that Jesus taught, preached, and wrought miracles in the synagogue of Capernaum. The apostles found synagogues in various places outside of Palestine, including those in the cities of Damascus, Iconium, Thessalonica, Athens, Corinth, and Ephesus.

Synagogues were formerly built with a partition 5 to 6 ft. high, on one side of which sat the men and on the other side the women. Special seats were provided for the scribes and Pharisees at the eastern end, and the buildings were constructed so the congregation faced the east. A platform was provided for the speaker or preacher, and near it was an ark containing Hebrew copies

THE GREAT SYNAGOGUE, TEL AVIV

Elements of modern architecture and traditional forms are combined in the structure of the Great Synagogue in the all-Jewish city of Tel Aviv

© *United Palestine Appeal*

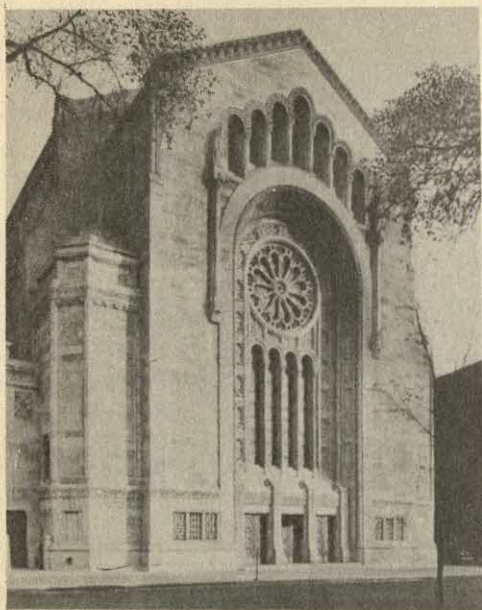


Courtesy Museum of Modern Art, N. Y.

TEMPLE JESHUA ISRAEL, NEWPORT, RHODE ISLAND

Probably the oldest synagogue in the United States, it was built in 1759-63

of the Books of Moses. Though regular rabbis or preachers were appointed, others present could be called to address the congregation, and this privilege was extended even to strangers. Synagogues of modern construction are built quite similarly in eastern countries, but in most European and American countries they more nearly resemble churches. The only architectural requirement for



TEMPLE EMANU-EL, NEW YORK

Dedicated in 1929, it is one of America's largest synagogues. Its architecture is an adaptation of romanesque style.

synagogues is that the congregation must face toward Jerusalem while worshipping. After the Babylonian captivity, Nehemiah is said to have founded a Jewish council, known as the Great Synagogue, to remodel the religious life of the Jews and to collect their sacred writings.

Synchro-Cyclotron (*sing-krô-sī'klô-trôn*). See *Accelerators*.

Synchronograph (*sing-krôn'ô-grăf*), an apparatus used in telegraphy for the rapid transmission of signals. A metallic disk is mounted on an axis, either the same or another axis than that on which the generator is mounted, and an alternating electric current is supplied to the disk through a brush. A tape that passes between the disk and the brush opens and closes the current. This instrument is used in connection with machine telegraphy, and the number of words transmitted per minute ranges from 2,000 to 3,500.

Synchrotron (*sing'krô-trôn*). See *Accelerators*.

Syncope (*sing'hô-pē*). See *Hypotension*.

Syncretism (*sing'krê-tiz'm*), a term originally meaning the amalgamation of contradictory opinions, but signifying more particularly the concept of a combination of religious faiths. The history of religion shows examples of two kinds of syncretism: the unconscious mutual influence of religions whose representatives are living together or near each other or are bound together sociologically or intellectually; and a conscious syncretism, based on the desire for mutual tolerance and on the results of scientific research in the field of the comparative history of religion. The most

SYNGE

famous example of the first type of syncretism is the interweaving of Greek Neo-Platonic thought with the ideas of early Christianity. Another example is the blending of Hindu and Mohammedan ideas in the faiths of certain Indian sects. Some branches of modern theosophy, anthroposophy, and even certain liberal Protestant movements and tendencies in Quakerism represent the second kind of syncretism.

Syndicalism (*syn'dī-kal-iz'm*), a variety of Socialism (*q.v.*), essentially French in origin and reflecting French working-class experience, which embodies the theory of industrial self-government by the producers and is antithetical to state Socialism. It advocates the control and ownership of all industry by the workers, operating through their trade unions (*syndicats* in French), and using the devices of strikes and sabotage in pursuit of class-war and direct action. Appearing in England as early as 1834, Syndicalism did not receive its impetus until 1902, when the General Confederation of Labor and the *Bourses du Travail* joined hands to express the characteristic French revolutionary idealism. Pelloutier in France and De Leon in the U.S. helped further the spread of the movement. In the U.S., the Industrial Workers of the World (*q.v.*) approximated Syndicalist ideas. Since 1920, Syndicalism has decreased, one of the reasons being the rise of Communism. It revived, however, in Spain, during the revolution of 1931.

Synge (*synj*), JOHN MILLINGTON, dramatist, born at Newtown Little, near Dublin, Ireland, 1871; died 1909. Educated at Trinity Coll., Dublin, he later studied music in Germany as well as several languages while he traveled the continent. Returning to Ireland, he became one of the

JOHN M. SYNGE

Drawing by John B. Yeats (1839-1922)



leaders of the Irish Literary Revival which drew upon the ancient legends and language of Ireland for inspiration. One of the literary directors of the Abbey Theater in Dublin, he devoted himself to playwriting. Among his worthy contributions to drama are: "The Shadow of the Glen" (1903), "Riders to the Sea" (1904), "The Playboy of the Western World" (1907), "The Tinker's Wedding" (1909), and others. He also wrote sketches of the people of the Aran Islands and several poems.

Synod (*šin'ūd*), an ecclesiastical council or assembly for mutual deliberation on matters of general interest affecting the churches within its jurisdiction and designed for their guidance. The term is used by the Lutheran Church in the U.S. to describe a supreme council known as the *general synod*, and a more limited one known as the *district synod*. It is similarly used by the Dutch and German Reformed churches, but the Presbyterians apply it to a council immediately between presbyteries and general assemblies. In this sense the term applies to a body composed of presbyteries or delegates from them. In the Presbyterian Church an appeal may be taken from the presbytery to the synod and from the synod to the general assembly.

Synoptic Gospels (*šin'p'it'ik*), the gospels of St. Matthew, St. Mark, and St. Luke, so called because of the similarity of the story of Christ related by the three.

Syntax (*šin'tāks*), the division of grammar which treats of the construction of sentences. The rules which govern in syntax differ according to the established usage and the languages to which they apply. In the English, which has few inflections, a large diversity of arrangement is not possible, the principle of juxtaposition being applicable to a large extent. In such languages as the Latin and German, which have a large number of inflected words, the relation of the principal elements of sentences can be indicated by changes in the forms of certain words, and the form of construction can be variegated. The correct placing of elements is called *arrangement*, which may be either in the natural or the inverted order. The *natural order* of arrangement is that which is most customary, while the *inverted order* is any departure from the natural order of arrangement. However, the construction of sentences or parts of sentences is governed by the logical relations of the thoughts which are expressed. The construction of sentences from words is known as *synthesis*.

Synthesis (*šin'thē-sis*). See *Analysis*; *Synthetics*.

Synthetics (*šin-thē'tiks*), substances prepared in the laboratory by building up molecules into materials which may or may not occur in nature. The term synthetic is derived from the word

synthesis which means to combine molecules into substances, as opposed to *analysis* which means to determine the chemical constituents to a substance. Thus, the natural acetic acid of vinegar may be analyzed to determine its chemical structure. Acetic acid may also be synthesized by building up exactly the same molecule through processing calcium carbide to acetylene, to acetaldehyde, to acetic acid. The synthetic acetic acid is identical with the natural acetic acid.

Hundreds of thousands of substances can be synthesized in the laboratory. Some are identical with natural substances and thus provide a controlled and usually less expensive source of the original material. The synthesis of the dyestuff indigo from naphthalene has made it no longer profitable to grow the natural indigo plant.

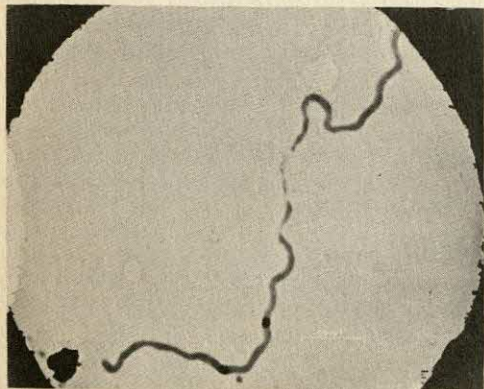
Some synthetic materials are not found in nature, but they have practical and important uses. Among these are the various kinds of plastics (*q.v.*) which are adaptable to far more uses than the natural resins. The synthetic fibers are another example of a laboratory product which does not duplicate the chemical structure of a natural fiber such as silk, wool, or cotton, but which fills the purpose for which the natural fibers are used. Among the important synthetic fibers are rayon (*q.v.*), casein fibers, and nylon (*q.v.*). Another synthetic material which is not a duplicate of a natural substance, but which serves in place of the natural material, is synthetic rubber (*q.v.*)

The field of synthetics has developed rapidly since the beginning of the 20th century. It has created an abundance of products which we use in modern living, and it probably will continue to advance as the knowledge of how to construct the complex molecules of natural substances increases. Among well-known synthetics are the dyestuffs from coal-tar which have almost entirely replaced natural sources of colors. Likewise coal-tar supplies many of the essential oils in perfumery and cosmetics. Among the pharmaceuticals, many important drugs have been synthesized, such as salvarsan, atabrine, anesthetics, aspirin, camphor, the sulfa drugs and more recently quinine. Synthetic gasoline can now be produced by the hydrogenation of coal or vegetable matter; by the cracking of crude oil; or by the polymerization of natural gases. Synthetic ammonia was first achieved in Germany in 1914 by Haber and Bosch, who synthesized it from nitrogen and hydrogen by the use of pressure and heat in the presence of a catalyst. The process has since been perfected by the use of better catalysts and activators.

Syphilis (*šif'i-lis*), or LUES VENEREA, is a chronic, infectious, contagious venereal disease of man, characterized by a variety of inflammatory lesions in many organs and systems of the body. It is caused by a microscopic spiral-shaped organism (spirochete) called *Treponema pallidum*.

Syphilis is generally transmitted by direct sexual contact, and so its first manifestation is usually on the genital organs. Occasionally, however, the infection is acquired by kissing, by using contaminated utensils or linen, by an infant nursing from an infected wet nurse, and not infrequently by an unborn child through the blood of an untreated syphilitic mother (congenital syphilis). Syphilis is a world-wide disease, affecting from 3 to 10 per cent of the population, and is about four times as prevalent in Negroes as in whites. It appears more commonly in the male.

The infection is passed from a surface lesion (sore) of one person directly into an abrasion of the skin or mucous membranes of the person contacted. The incubation period averages about 21 days. The course of untreated syphilis is usually divided into three stages. The first stage (primary syphilis) is characterized by the appearance on the genitalia and occasionally elsewhere of the *chancre* (primary sore), which is a painless, hard, oval-shaped, raised ulcer about one-half inch in diameter. This usually heals in about 4 to 6 weeks. The second stage (secondary syphilis) appears about 4 to 8 weeks thereafter with typically a generalized, variable-sized, rosy or copper colored rash. The palms and soles are affected with a similar but scaling rash, and there may be a patchy loss of hair. Mucous patches are frequently seen on the mucous membranes of the mouth and genitals. The third or late stage of syphilis appears from months to years later. Here the skin lesions are variable or absent, but great damage may occur to the nervous system (neuro-syphilis), the blood vessels (cardio-vascular syphilis—syphilitic heart disease), the bones, and other organs, with relative symptoms and debilitation. Paresis and tabes are syphilitic involvement of the brain and spinal cord with resultant defects of mentality and muscular coordination.



Courtesy RCA Victor, Camden, N. J.

SYPHILIS BACTERIA

Electron micrograph showing hair-like flagella, magnified 31,000 times

Diagnosis of syphilis depends upon microscopic identification of spirochetes from the early lesions and upon a blood test for all stages after the early incubation period. Sometimes a test of the spinal fluid is necessary in cases of late syphilis. The blood test used for many years is the Wassermann test—based on a specific reaction between extract of beef heart, rabbit serum, and infected patient's serum. More recent modifications of this test commonly used are the Kline, Kahn, Hinton, and Mazzini tests.

Standard treatment of syphilis has consisted of long courses of injection of mercury, arsenic, and bismuth compounds, varying according to the stage and severity of the disease. All spirochetes must be eliminated to insure a cure. Regression of the disease is indicated by change of the blood test from positive to negative. Recently penicillin in massive doses has been widely used (now standard treatment in the U.S. Army), resulting in apparent cure of primary and secondary syphilis in a matter of days, but the permanent curative effect is yet to be definitely determined. See also *Gonorrhea*; *Salvarsan*; *Neoarsphenamine*; *Venereal Disease*.

Syra (sē'ra), or syros, an island of the Cyclades, situated in the Aegean Sea, 20 m. n.w. of Paros. The area is 31 sq. m. Formerly it had forests of considerable value, but they have been extensively cut and the island has been denuded of its fertility. Hills and narrow valleys characterize the surface. It is the site of Hermopolis, the capital of the monarchy which includes the Cyclades, and is an important seaport of Greece. The city is located at the head of a bay on the eastern coast, near the site of the ancient city, and has a large and convenient harbor. Population, ca. 21,000.

Syracuse (sir'a-kūs), a city in New York, seat of Onondaga County, located 60 m. e. of Rochester and extending south from the flat lands at the head of Onondaga Lake. The city covers an area of 25.68 sq. m. and is served by the New York Central and the Delaware, Lackawanna and Western R.R.'s. Hancock Field, a former Army base, is now a municipal airfield located 6 m. n. of the central business district.

DESCRIPTION: The city's more than 170 parks cover 2,368 acres and are supplemented by six county and two state parks. The State Fair grounds, site of the annual New York State Agricultural and Industrial Exhibition since 1890, are situated at the western edge of the city and include a coliseum seating up to 5,750 persons. Among the principal thoroughfares are Erie and Oswego Blvds., both laid over the beds of old canals. Located around St. Mary's Circle are the First Baptist Church, the courthouse, the public library, the Cathedral of the Immaculate Conception, and the Wesleyan Methodist Church, the oldest religious structure in use in the city (dating from 1845). The Weighlock Bldg., at



EGYPT



VENICE, 14th CENTURY



COLUMBUS' FLAGSHIP, SANTA MARIA



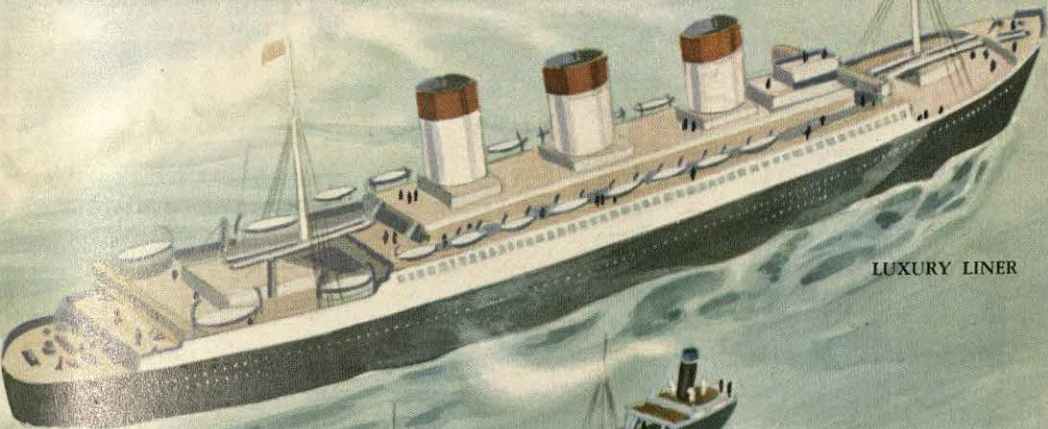
ENGLISH MERCHANT, 17th CENTURY



CLIPPER, *FLYING CLOUD*, ca. 1850



FULTON'S CLERMONT, 1807



LUXURY LINER



TANKER



VICTORY SHIP



SCHOONER



YACHT



CABIN CRUISER



MERCHANT VESSELS THROUGH THE CENTURIES

FIGHTING SHIPS THROUGH THE AGES



ANCIENT GREEK



ANCIENT ROMAN



VIKING SHIP



SPANISH ARMADA



U. S. FRIGATE, THE CONSTITUTION, 1797



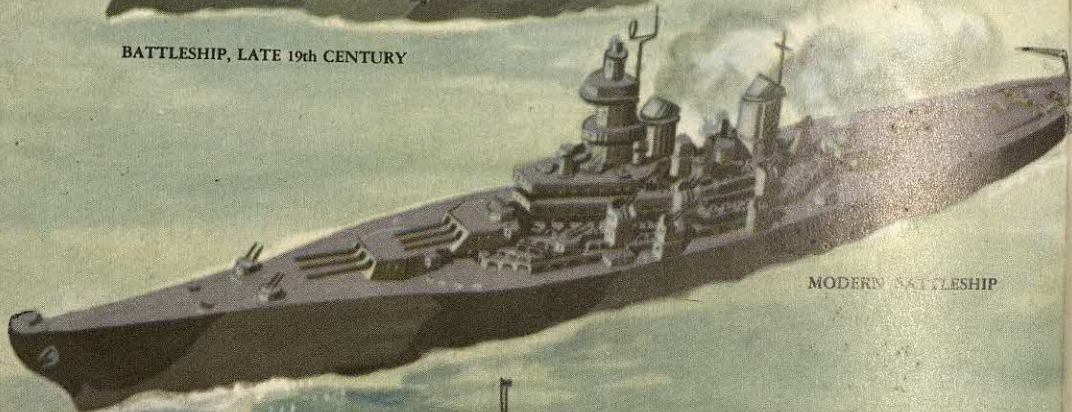
PIRATE SHIP, C. 1650



BATTLESHIP, LATE 19th CENTURY



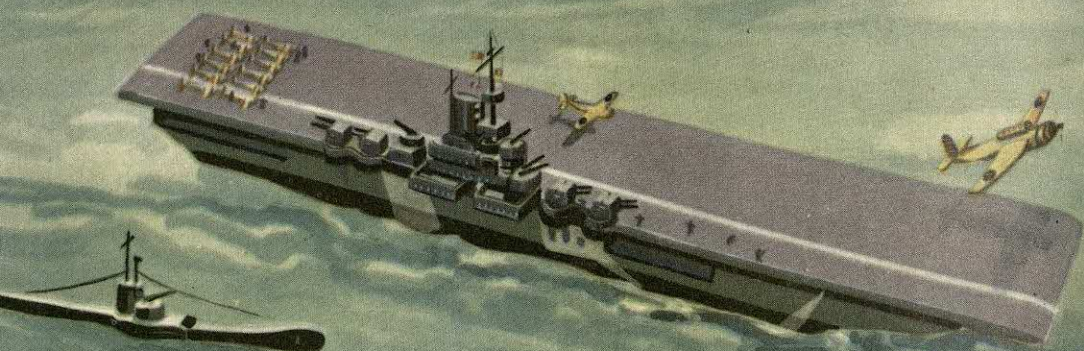
MERRIMACK, CIVIL WAR



MODERN BATTLESHIP



MODERN CRUISER



AIRCRAFT CARRIER



SUBMARINE

the junction of Erie and Oswego Blvds., is a Greek Revival structure of national historical importance. The auditorium of the Onondaga County War Memorial building on Montgomery St. has a maximum seating capacity of 9,000. The Onondaga Indian Reservation, with an Indian population of 887 persons in 1957, is located on the western edge of the city.

COMMERCE: Syracuse has developed diversified commercial and industrial activities. Among the many products manufactured here are electronic equipment; typewriters and business machines; laundry, air-conditioning, heating, and refrigeration equipment; traffic signals and airport-lighting equipment; and fine china, bicarbonate, soda ash, clothing, conveyers, and candles. Syracuse is the center of a standard metropolitan statistical area (pop., 1960, 563,781) including Madison, Onondaga, and Oswego counties. The city produced a value added by manufacture of \$190,799,000 in 1958. Conventions attract 50,000 visitors to the city annually. The recreational facilities of the Adirondack Mts. and of Ontario, Oneida, and the Finger lakes are readily accessible (within two hours' drive). Electronics Park, the General Electric center for development and production of TV, radio, and related devices, is located 4 m. from the center of the city. Agricultural activities of the area center on milk and egg production and production of fruits and vegetables.

EDUCATION: The public schools of Syracuse enroll ca. 31,000 annually; the parochial schools, ca. 13,000. Institutions of higher learning include Syracuse Univ., with nine colleges and seven schools; the State Coll. of Forestry; the State Univ. Coll. of Medicine; and LeMoyne Coll. (a Jesuit institution). There are two art museums and a museum of local history.

GOVERNMENT: Syracuse is administered by a mayor-council form of government. The mayor, the president of the common council, and four councilmen at large serve four-year terms, and five district councilmen serve two-year terms.

ELECTRONICS PARK, SYRACUSE

Aerial view of the electronics center of the General Electric Co., opened in 1957

Courtesy Fairchild Aerial Surveys, Inc., N.Y.



HISTORY: The Syracuse region was the home of the Onondaga Nation and the capital of the Five Nations of the Iroquois (see *Iroquois*). The date of the first white settlement is generally considered to be 1788. For nearly a century, saline springs near Onondaga Lake provided the principal supply of salt for the U.S. interior. Rapid development of Syracuse followed the opening of the middle section of the Erie Canal in 1820, and the first railroad entered the city in 1838. Syracuse was incorporated as a village in 1825 and as a city in 1848.

POPULATION: In 1850 the population of Syracuse was 22,271; due to the annexation of outlying districts, it rose to 108,374 in 1900, and to 220,583 in 1950. A subsequent decline was attributable to the greater rate of growth of the surrounding metropolitan area. In 1960 the population was 216,038.

Syracuse (Italian SIRACUSA), seaport and capital of Siracusa province (area, 849 sq. m.; population, 1957, 332,617), Italy. It is located on Ortygia—a small island in the Ionian Sea connected with Sicily by a bridge—as well as on Sicily itself. Primarily noted for its grandiose past, the city manufactures ceramics and carries on flour milling and an extensive export trade in olive oil and citrus fruits. It is frequently visited by tourists who are attracted by the many remains of antiquity, the 7th-century cathedral (rebuilt late in the 17th century), with a baroque façade of the mid-18th century, and several museums (e.g., the Museo Nazionale, housing collections from Sicily's past). The city was a part of the kingdom of the Two Sicilies (see *Sicily*), and after Garibaldi's victory in 1860 it was united with the kingdom of Italy. It was bombed by the Allies in World War II and taken by the British on July 12, 1943.

Syracuse was one of the most important cities of ancient times and the most important Greek colony in Sicily. After its founding in 734 B.C. by Corinthian colonists, the city gradually grew in size and extended its influence throughout Sicily. Beginning in the 5th century B.C., it assumed great strength, particularly after it was conquered (485 B.C.) by the tyrant Gelon of Gela. The economic and cultural growth of Syracuse continued under succeeding rulers, the most famous being Hiero I, Dionysius the Elder, Dionysius the Younger, and Hiero II. They ruled between 478 B.C. and ca. 215 B.C. The city was unsuccessfully besieged by the Athenians (415-413 B.C.). It was conquered by the Romans after a three-year siege, ending in 212 B.C., during which Archimedes (q.v.) was killed. It remained a cultural center thereafter but was no longer a center of power. With the decline of Rome, the city, too, lost in importance. It was captured and pillaged by the Saracens (A.D. 878), and subse-

quently it fell into decay. Among the famous buildings of ancient Syracuse were two Doric temples to Apollo and Athena, a fountain of Arethusa, a fortress built by Dionysius I, a Greek theater, and a Roman amphitheater. There are also remains of early Christian catacombs and medieval churches.

Population of modern Syracuse was 76,935 in 1957.

Syracuse University, a coeducational non-sectarian institution at Syracuse, N.Y., founded in 1870. It comprises 16 academic divisions in the areas of business administration, education, engineering, fine arts (art, architecture, and music), graduate studies, home economics, journalism, law, liberal arts, library science, nursing, speech and dramatic art, social work, University Coll. (adult education), Utica Coll. (liberal arts division at Utica), and the Maxwell Graduate School of Citizenship and Public Affairs. Nearby is the State Univ. of New York Coll. of Forestry at Syracuse Univ. The faculty on the main campus numbers over 500, and the student enrollment totals above 16,000. The university has a library of about 500,000 volumes, and its property exceeds \$35,000,000 in value.

Syr Darya (*sir dār'ya*), or **SIR DARYA**, a river of Western Asia, about 1,500 m. long. It rises in the Tien Shan Mts. of Chinese Turkestan and flows west, north, and northwest through the Kirghiz, Uzbek, Tadzhik, and Kazakh Soviet Socialist Republics into the Aral Sea. In its upper reaches the river is called the Naryn. Because of its shallowness the river is not navigable, but it is used for hydroelectric power and for irrigation purposes.

Syria (*sir'i-ä*), a country in southwestern Asia, bounded on the n. by Turkey, on the e. and s.e. by Iraq, on the s. by Jordan, on the s.w. by Israel, and on the w. by Lebanon and the Mediterranean Sea.

DESCRIPTION: Syria, comprising an area of 72,234 sq. m., is mostly flat and dry; most of the central and southeastern section is desert, and there are mountain ranges (highest elevation, about 5,800 ft.) separating Syria from Jordan and Lebanon. Temperatures are mild, and in the summer months there is almost no rainfall in the entire country. The two largest rivers are the Euphrates and the Orontes. Syria's few mineral resources include asphalt, salt, and gypsum. The capital and most important city is Damascus; other cities are Aleppo, Homs, and Latakia.

INDUSTRIES: Agriculture and cattle raising are Syria's chief occupations. The principal crops are wheat, barley, sorghum, corn, cotton, sugar beets, and fruits, especially apricots, dates, and grapes. Sheep, goats, camels, and cattle are raised extensively. The most important industries are the raising and processing of tobacco, tanning, and

production of olive oil, soap, cement, and flour.

COMMERCE AND TRANSPORTATION: Syria's principal exports are textiles, live animals and animal products, and foodstuffs; imports are chiefly mineral products and machinery. There are about 540 m. of railroads and 4,000 m. of highways in the country, and the airport at Damascus has international service. The monetary unit is the Syrian pound (see *Coin*).

POPULATION: In 1952 Syria's population was estimated at 3,381,000. About 86 per cent of the people are Arabs; other ethnic groups include Turks, Kurds, Circassians, and Armenians. The bulk of the population is rural, and there are about 500,000 Bedouin nomads.

LANGUAGE AND RELIGION: The official and prevailing language is Arabic, spoken in a number of different dialects. About 85 per cent of the people are Moslems; of the remainder, most are Christians belonging to various denominations of the Eastern Church.

EDUCATION: Elementary education is free and compulsory, but there is a high rate of illiteracy. In 1951 Syria had 2,448 primary and secondary schools. The Syrian Univ., founded in 1924, is at Damascus and has an engineering branch at Aleppo. There is also an Arab Acad. in Damascus, which was founded in 1919.

GOVERNMENT: Before Syria joined Egypt in the United Arab Republic (*qq.v.*) in 1958, it had a republican form of government, based on a constitution promulgated in 1950 and reinstated in 1954. The president, elected by the 142-member chamber of deputies for a five-year term, held executive power. He was assisted by a cabinet, headed by a premier. Under the union, abolished in 1961, Syria was first governed under a dual system but later by a centralized body, directed from Cairo. Since 1961, the government has been in civilian hands, with its capital in Damascus.

HISTORY: The history of Syria dates from remote antiquity. Because of its strategic location on the military and trade routes between Mesopotamia and the Mediterranean, the country has frequently been the object of conquest; throughout the greater part of its long history it has been held by foreign powers. From the 19th through the 13th centuries B.C., the region belonged to the Hittite empire, although for many years during this period it was held by the Egyptians. The first great indigenous civilization was that of the Phoenicians, whose prosperous trading cities on the coast of modern Lebanon flourished after 1250 B.C. Syria was frequently invaded and intermittently controlled by Assyria and was also conquered by Babylonia. Syria prospered under the Persian empire. After the death of Alexander the Great, who had conquered Persia (332-331 B.C.), Syria passed under the sway of his general, Seleucus Nicator. In 312 he received

Babylonia, and in 301 he enlarged his holdings to include all of Syria; the Seleucid dynasty ruled the region until its conquest by the Romans under Pompey (ca. 65 B.C.). After the 1st century A.D. the autonomous state of Palmyra in central Syria achieved considerable power, but it was destroyed in 272 by the Romans, under the emperor Aurelian, when it began to pose a threat to Roman authority in the Middle East.

Syria was one of the earliest centers of Christianity, and for several centuries Antioch was a stronghold of the Church. In A.D. 636 the country was invaded, then conquered (640) by the Arabs, and Islam replaced Christianity as the principal religion. Syria was taken by the Crusaders toward the end of the 11th century but later fell to Saladin (q.v.) and the Seljuk Turks. After devastating invasions by the Mongols and other peoples, Syria fell in 1516 to the Ottoman Turks. They controlled it continuously for about four centuries, except for a brief occupation (1799) by the French under Napoleon and another in the 1830's by the Egyptians. In World War I the Turks were expelled from Syria by the British. After the war, as a result of previous agreements between France and Great Britain concerning their respective spheres of influence in the Near East, Syria and Lebanon (q.v.) were mandated (1920) to France and divided into several units, known collectively as the Levant States. A revolt (1924-25) against French rule resulted in the amalgamation (1925) of the states of Damascus and Aleppo into the new state of Syria; in the following year Lebanon was made a separate state. In 1930 the new Syrian state was granted a certain degree of autonomy, but despite French promises to end the mandate no move in this direction was made until 1936, when a Syrian general strike for independence broke out. France then drafted a treaty giving Syria virtual independence and providing for her admission to the League of Nations; however, the French National Assembly postponed ratification of this treaty. In 1939 anti-French feeling ran high throughout Syria when the state of Alexandretta, now called Hatay (q.v.), was ceded to Turkey. In the same year France abolished the Syrian constitution and garrisoned the country with large numbers of troops. After the fall of France in June 1940 the majority of these troops remained loyal to the Vichy government. When it was learned that Syrian airfields were being used by German planes en route to Iraq, British and Free French forces invaded and occupied Syria in June 1941. Three months later, in accordance with previous promises, the Free French administration proclaimed a free Syrian republic, and, in January 1942, the adjoining territories of Latakia and Jebel ed Druz were incorporated in the new country. The continued presence of

French troops in Syria caused much friction until they were finally withdrawn in April 1946.

Syria became a member of the Arab League (q.v.) and was involved in the unsuccessful Arab war against Israel (q.v.) in 1948. After the conflict, Syria was torn by internal disorders, which brought about a succession of governments established for the most part by military *coups d'état*. In 1958 Pres. Shukri el-Kuwatly, in the face of his government's inability to cope with mounting Soviet Russian influence within the country, merged Syria with Egypt (q.v.) to form the United Arab Republic (q.v.). Approved in February 1958, the union was abolished by a Syrian military *coup d'état* in September 1961, and the Syrian government was returned to a group of civilians.

Syrian Christians (*šir-i-qn kṛis'chanz*), a general name which is given to Christians living in India, Kurdistan, and the Middle East who use the Syriac language in religious services or who formerly did so. It applies to members of several sects, among whom are the Maronites (q.v.) and the Chaldean and Syrian Uniates, who acknowledge the supremacy of the pope in Rome. Also included are the Nestorians (q.v.), led by a Nestorian patriarch, and the Jacobites (q.v.), led by the patriarch of Antioch.

Syrian Desert, a vast, arid waste region of the Near East, extending from the cultivated lands along the eastern Mediterranean Sea to the valley of the Euphrates River. The desert comprises western Iraq, eastern Jordan, and southeastern Syria and is inhabited by several nomadic and seminomadic tribes, who raise the famous Arabian horses, sheep, camels, and other livestock.

DAMASCUS—THE CAPITAL OF SYRIA

View of the Hejaz railway station



Syringa (*sī-rīng'gā*), a hardy shrub of the genus *Philadelphus*, commonly called the mock orange. It is bushy and bears large white, mostly clustered, flowers with a pleasant odor. The syringa grows to a height of 10 ft. and is grown extensively in gardens.

Szechuan (*sā-chwān'*), the largest of China's provinces, covering an area of 166,485 sq. m. Located in south central China, the province is drained by the Yang-tse Kiang and its many tributaries. Although the western region of Szechuan is quite inaccessible and limited as to agricultural resources, the eastern section is fertile country. Mineral deposits include coal, iron, copper, and others. Crops include rice, barley, maize, millet, buckwheat, tobacco, tea, sugar, indigo and hemp. Silk and other cloths are produced largely by home industries; other manufactures are fans, salt, umbrellas, gauze, silk embroideries, paper and iron ware. The capital is Cheng-tu, but the most important commercial city is Chungking. In addition to river transportation the province has several pack roads. Population, *ca.* 3,000,000.

Szeged (*sē'gēd*), a city of Hungary, at the confluence of the Maros and Theiss Rivers, 105 m. S.E. of Budapest. It is an important railroad junction. The surrounding country is fertile, producing large quantities of corn, tobacco, and fruits. It has manufactures of soap, matches, leather, tobacco products, salt, soda, cotton and woolen goods, machinery, and lumber products. The principal buildings include the government offices, the superior law court, numerous public and secondary schools, and several convents and churches. Szeged has a large railroad and river commerce, the articles of trade being manufactures, livestock, cereals, and lumber. The city stands in a marshy plain and is defended by a fortress built by the Turks in the 16th century. The inhabitants consist almost entirely of Magyars and Slavs. During World War II the city was taken by the Russians in 1945. Population, *ca.* 150,254.

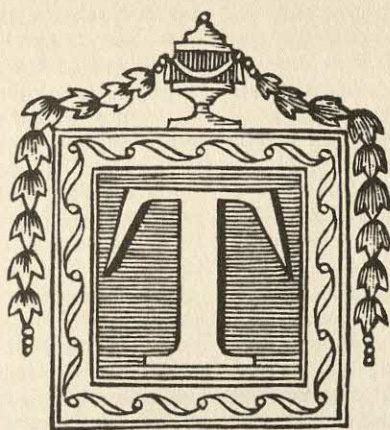
Szell (*sēl*), GEORGE, orchestra conductor, born in Budapest, Hungary, June 7, 1897. He was educated at the State Acad. of Music in Vienna, making his debut as piano soloist with the Vienna Symphony Orchestra in 1907 and his debut as a conductor with the Berlin Philharmonic Orchestra seven years later. From 1924-29, he was conductor of the Berlin State Opera and the Berlin Broadcasting Symphony Orchestra. In 1929, he went to Prague, where he served simultaneously as general musical director of the German Opera

House and Philharmonic concerts and professor at the Acad. of Music and Dramatic Arts. He left Prague in 1937 and spent two years as conductor of the Scottish Orchestra of Glasgow and semi-permanent conductor of the Residentie Orchestra of The Hague. Although he made his U.S. debut as a conductor in 1930, he has served as guest conductor of most of the leading U.S. symphony orchestras for several years. He conducted the Metropolitan Opera Orchestra, 1942-45, and was appointed musical director and conductor of the Cleveland Symphony Orchestra in 1946.

Szent-Györgyi von Nagrapolt (*sēnt-dyūr'dyī fōn nōd'y-rō'pōlt*), ALBERT, Hungarian biochemist, born Sept. 16, 1893, in Budapest, Hungary. He was educated in that city, and after spending years of study and research in foreign countries, he returned to Hungary (1930) to become professor of medical and organic chemistry at the Univ. of Szeged. He was arrested for pro-British sentiments in 1944 but was shortly released and fled to the country. On his return, he was elected (1945) to the Hungarian Parliament as a candidate of the Social Democratic party. He was awarded the Nobel Prize for physiology and medicine in 1937 "for his discoveries relating to biological combustion, especially with regard to vitamin C and the catalysis of fumaric acid." He is the author of "Studies on Biological Oxidation" (1937) and "On Oxidation, Fermentation, Vitamins, Health, and Disease" (1939).

Szigeti (*shē-ge'tī*), JOSEPH, violinist, born Sept. 5, 1892, in Budapest, Hungary. A child prodigy, he made his debut at the Royal Acad., Budapest, when he was only 13. From 1912-17 he made a concert tour of Europe and from 1917-24 taught the violin master classes at the Geneva Conservatory of Music. He made his U.S. debut with the Philadelphia Orchestra in 1925 and has since then appeared frequently with concert orchestras in the U.S. Many composers, including Béla Bartók, Ernest Bloch, and Ferruccio Busoni have written music especially for Szigeti.

Szold (*shōld*), HENRIETTA, Zionist leader, born in Baltimore, Md., Dec. 21, 1860; died Feb. 13, 1945. She left her work as a teacher in private schools in Baltimore (1878-92) to become a member of the staff of the Jewish Publishing Society of America (1892-1916), and after 1916 devoted herself to the Zionist movement in the U.S. and Palestine. In order to further the project of re-establishing Palestine as the center of the Hebrew world, she founded the Hadassah, a women's Zionist group in the U.S.



T (*tē*), the 20th letter and 16th consonant of the English alphabet. It is a sharp mute and is closely associated with *d*, the two being frequently interchanged in some languages. In German it is quite similar to *z*, as in *Pestalozzi*. It is made by placing the tip of the tongue closely against the front part of the palate and then giving a quick and strong emission of the breath. In some words, as in *nation*, *action*, and *portion*, it has the sound of *sh*. It is silent in some words, as in *castle*, *listen*, and *christen*.

Tabard (*tāb'ērd*), a kind of tunic or mantle worn as a protection from the weather during the Middle Ages. Usually it was worn over the armor, when it was decorated with the arms of the wearer. The name *Tabard* was applied to an inn of London, England, in the 14th century. It was located on High Street, Southwark, and was the starting place for the pilgrims mentioned by Chaucer in his "Canterbury Tales," when they went upon their journey to the shrine of Thomas à Becket. The sign of the inn was a tabard, or sleeveless jacket.

Tabernacle (*tāb'ēr-nā-k'l*), a tent or sanctuary constructed under the direction of Moses in compliance with divine authority, and used while the Israelites were in the desert. It was built in the form of a parallelogram, 45 ft. long, 15 ft. wide, and 15 ft. high. Golden rings were used to fasten the upright boards together, while the ends were set into silver sockets, and the upper covering was made of carpet. A court 75 x 150 ft. surrounded the tabernacle, and in the eastern half of the court was an altar for burnt offerings. Between the altar and the tabernacle was a laver or basin used by the priests to wash their hands and feet before passing into the sanctuary. The interior of the tabernacle was divided by a cur-

tain into two compartments, the outer called the *sanctuary* and the inner the *holy of holies*. Near the center of the sanctuary was the altar on which incense was burned by the high priest each morning and evening. The holy of holies contained a gold-plated and gold-lined box of acacia wood, called the *ark of the covenant*, with the Ten Commandments written on two tablets.

The people gathered in the east end of the court to worship, while only the priests entered the sanctuary, and this but twice daily, in the morning to extinguish the lights and in the evening to light them. The holy of holies was entered by no one but the high priest, who went into it but once a year, on the great day of atonement. The temple of Solomon superseded it, but that king provided a place for it in the temple, thus making Jerusalem the central place of Jewish worship. The feast of the tabernacle was one of the three leading Jewish festivals, and its celebration required the presence of all the males at Jerusalem. It was held to commemorate tent life in the wilderness. In the later period the feast partook of thanksgiving for the completion of the harvest and the vintage. This festival was held in autumn, lasting eight days, the first and eighth days being holy convocations.

In the Roman Catholic Church, a tabernacle is a receptacle for containing the Eucharist.

Tabes (*tā'bēz*). See *Locomotor Ataxia*.

Tabitha (*tāb'i-thā*). See *Dorcas*.

Tableland (*tā'b'l-lānd*). See *Plateau*.

Table Mountain (*tā'b'l moun'tin*), or **TABEL-BERG**, a mountain of South Africa, in Cape Colony, situated near Cape Town. It has an elevation of 3,560 ft. The summit furnishes a fine outlook across the city and Table Bay. It is so named on account of its peculiar shape and level top.

White clouds, termed *tablecloth*, frequently envelop the summit.

Table Tennis (*tā'b'l tēn'is*), a game derived from lawn tennis (*q.v.*), played with a celluloid ball and wooden bats on a table 9 ft. long and 5 ft. wide. The table stands 30 in. off the floor and is divided by a net. A white line, $\frac{1}{8}$ in. wide, runs lengthwise down the middle of the table and is called the service line. The celluloid ball weighs from 37 to 39 grains; the bat measures 7 x 6½ in. and has a handle 3 to 4 in. long. Its surface is either rubber, plain wood, or sandpaper. The net dividing the table is 6 in. above the playing surface. A game is constituted by 21 aces. Table tennis, like lawn tennis, had its beginnings in the 1880's in England. It was not until 1926, however, that the game was launched on a major scale with the formation of the International Table Tennis Federation. World championship matches are now held annually. In 1947 Verhuslav Vana, of Czechoslovakia, was the men's singles champion and Vana-Adolph Slar, also of Czechoslovakia, was the women's singles champion. Table tennis is frequently called "Ping Pong," but this name is a copyrighted property for one manufacturer of table tennis equipment.

Taboo (*tā-bōō'*), a magic prohibition forbidding contact with or the use of something. It always signifies the magic or religious sanctioning of certain objects or of certain actions. The word is from the Polynesian languages, since it was in Polynesia that Europeans first came into contact with the idea. It is by no means confined to any one geographical region, however, but is common to all primitive peoples. Together with other magic concepts, it penetrates into more highly developed forms of religion and traces of it still permeate modern civilization. The idea of taboo is of great importance from a psychological, sociological, and religious point of view.

In the earliest phases of culture, taboo provided protection of graves, cult centers, the person of the tribal leader, certain houses, even certain objects of nature like trees or fountains. The law forbidding something may be considered as the most primitive expression of a negative moral obligation. The idea of sacred protection in taboo is simultaneously connected with the idea that certain things are unclean; thus, all rules about forbidden food are forms of taboo.

The concept of taboo may be explained by the belief that magic powers are inherent in taboo things or persons, sometimes considered to be naturally taboo, sometimes made so by the transfer of taboo to an object or person by the chief or medicine man of a tribe. The implications of the sanctions exercised by taboo are mainly social. The man who violates the taboo will be punished either by some magic spirit or by his tribe directly. The punishment of the violator of taboo

automatically meant purification, in some cases only of his fellowmen, in other cases also of the individual violator himself. With almost all primitive peoples, murderers, violators of the sex code, and strangers were taboo. Sometimes the taboo was extended to warriors and priests, almost always to the dead, in some cases even to the clothing, food, and other property of taboo persons. The violation of taboo always endangered the violator. The animistic theory (*q.v.*) explains taboo as a fear of spirits or of the dead. When, however, taboo becomes part of the general mores of a tribe, the sanction character of the taboo recedes and a kind of moral obligation develops. A combination of taboos results in a group code and in its higher form in specific morals, which prescribe a certain pattern of behavior.

The forms of taboo among the Polynesians, American Indians, African tribes, and North and Central Asiatics are almost innumerable, but the categories mentioned above are common to all of them.

Gradually taboo, with its double implication of being dangerous and unclean, develops into a religious element of morality and social behavior. The unclean becomes the unholy. Violation of the taboo can be remedied by prayer, fasting, physical punishment, and repentance. Out of this concept developed certain specific prohibitions. Thus, for the Greek, the warrior during the war was sacred, which actually means taboo. The Roman Vestal virgins were taboo. For the Jews the name of Jehovah was taboo, as were certain foods, women during menstruation, etc. Even certain periods of religious feasts create a taboo. Thus, the Jews made leavened bread taboo during Passover, the Mohammedans made all food taboo in the daylight hours during Ramadan.

Modern psychology, under the influence of Sigmund Freud (*q.v.*) and the schools which have been developed by his disciples, has generalized the idea of taboo as an elemental category, a quality of the race developed or repressed by social circumstances.

Tabor (*tā'bēr*), MOUNT, a famous mountain in northern Palestine, rising abruptly in the plain of Esdraelon to a height of 1,900 ft. It furnishes a magnificent view of the Holy Land. From its summit the tourist may catch a gleam of the Sea of Galilee fully 15 m. distant, while the adjacent plains and a large part of the Jordan basin may be viewed. Fine forests of oak and pistachio grow on its slopes and summit, in which wolves, lynxes, and reptiles find a haunt or retreat. Tabor was long thought to be the scene of Christ's transfiguration, but it is now reasonably clear that that event occurred farther north and that a fortified city occupied the region in its vicinity for centuries. The Crusaders built many fine churches and monasteries on Mt. Tabor and

traces of them still remain. Napoleon I gained a victory over the Turks on its slopes.

Tabriz (*tā-brēz'*), the second largest city in Iran, in Azerbaijan province, 330 m. n.w. of Teheran. It is located on the main route from Teheran to Turkey on the w. and the U.S.S.R. on the n. Carpets and dried fruits are the major exports, and leather-making, cotton and wool spinning, and match-manufacturing industries are located here. Noteworthy landmarks include the ruins of the Blue Mosque (15th century) and of the Mosque of 'Ali Shah (a medieval citadel). Tabriz is also the seat of a university.

The city (known as Tauris in ancient times) is thought to have been established long before Tiridates III of Armenia made it his capital in A.D. 297. It was occupied by the Turks at various times from the 15th through the 18th centuries and by the Russians in 1827-28 and during World Wars I and II. In 1946 a movement that centered in Tabriz sought to make Azerbaijan independent of Iran but failed. Population, 1956, 290,195.

Tachometer (*tā-kōm'ē-tēr*), an instrument for measuring the speed of rotation of machinery. The chronometric tachometer is made to measure speeds up to 30,000 revolutions per minute. It need only be held against the casing of the machinery in order to set a stop watch in motion which automatically clocks the revolutions within a specified period of time. Other tachometers utilize small electric generators which measure the speed of the machinery by the amount of voltage produced. These instruments are attached to the shaft of the rotating machine.

Tacitus (*tās'i-tūs*), CORNELIUS, historian, born ca. A.D. 55; died ca. 120. The little that is known about his personal life is gathered from references in his own works and a few letters from his friend the younger Pliny. He was a Roman praetor, tribune, and consul, and an advocate before the Roman bar. He married into the family of the great Julius Agricola, a fact which may indicate that he himself was of good parentage. With Pliny, he successfully prosecuted Marius Priscus for misadministration of the province of Africa. See also *Agricola*.

Tacitus lived through the reigns of nine Roman emperors: Nero, Galba, Otho, Vitellius, Vespasian, Titus, Domitian, Nerva, and Trajan. Although his public life was certainly honorable and successful, and especially happy under Nerva and Trajan, he was deeply affected by the three-year "reign of terror" under Domitian. He was himself a senator at the time and felt a deep complicity in the official murder of so many respectable Roman citizens. This experience had a marked effect upon the nature of his writing and upon his personal outlook. Although he does not seem to question the nature of the system under

which he lived, he was critical of the personal lives of many public figures. An outstanding characteristic of his work, in fact, is that it is ethical in nature rather than political.

In the "Dialogue on Orators" (*"Dialogus de oratoribus,"* 76 or 77), Tacitus discusses the decay of Roman eloquence and the shortcomings of the educational system. In "Germany" (*"De origine situ moribus ac populis Germanorum,"* 98), he comments on the simplicity and fierceness of the people and notes unfavorably the sophistication and degeneracy of the Romans. The "Histories" (*"Historiae,"* 115 or 116) covers the period of the empire from Galba through Domitian; it also provides a picture of the cultural and religious life of the Jewish nation, though from the rather special point of view of a Roman patrician. The "Annals" (*"Annales,"* ca. 117), reviews the lives of the Julian emperors from Tiberius to Nero. His "Life of Agricola" (*"De vita et moribus Iulii Agricolae,"* 97 or 98), is still regarded as a classic example of biography.

In style, the writing of Tacitus is compressed and epigrammatic; however, he sometimes carries this otherwise admirable talent to an extreme. In gathering and utilizing the materials available to him, he was thorough and conscientious.

Tacna-Arica (*tāk'nā-ā-rē'kā*). See *Chile; Peru*.

Tacoma (*tā-kō'mā*), a city situated on Puget Sound, seat of Pierce County, Washington. The city covers an area of 47.44 sq. m. and is served by the Northern Pacific, the Chicago, Milwaukee, St. Paul and Pacific, and other railroads. The Tacoma Narrows Bridge, the nation's fourth-longest suspension bridge (5,450 ft. between anchorages) links the scenic sites and recreational facilities of Puget Sound with those of the Olympic Peninsula. Seattle-Tacoma International Airport is 17 m. n. of the center of the city.

DESCRIPTION: The Tacoma metropolitan park district includes about 40 parks and playgrounds,

TACOMA NARROWS BRIDGE

The four-lane, 5,979-ft. bridge was dedicated in 1950
Courtesy Tacoma Chamber of Commerce



TACOMA

with an area of 1,700 acres. Point Defiance Park (638 acres) is noted for its rose and other flower gardens; Wright Park contains a fine arboretum, with ca. 1,000 trees of 111 varieties; the Living War Memorial Park is located at the eastern end of the Tacoma Narrows Bridge. Landmarks within the city include the State Historical Museum, noted for its illuminated photomurals; Old Ft. Nisqually, built by the Hudson's Bay Co. in 1833; and St. Peter's Church, built in 1872-73 and known for its unique bell tower, a Douglas fir tree (the present tree trunk was treated to preserve it against windstorms, etc.; the original fir fell during a windstorm 61 years after the bell was mounted on it). Worthy of note is the Totem Pole, at Ninth and A Sts., one of the largest totem poles in the world.

Manufacturing and industrial areas of the city lie east of downtown, along South Tacoma Way (U.S. 99), and between South Tacoma Way and Center St. Preferred residential areas are on the north side, the west side, and in the Lakes district, south of the city in the vicinity of Steilacoom Lake, American Lake, and Gravelly Lake. Important in the life of the city are Ft. Lewis (110,000 acres); McChord Air Force Base, and Mt. Rainier Ordnance Depot.

COMMERCE: Tacoma's principal industries are steel and wooden shipbuilding yards, electrometallurgical and electrochemical plants, and the western division shops of the Northern Pacific and the Chicago, Milwaukee, St. Paul and Pacific R.R.'s. The Tacoma Smelter receives ore from all over the world and refines about one-tenth of the nation's copper. Gold, silver, and sulfuric acid and other chemical by-products are also produced at the smelter. The city's manufactures include plywood, furniture, pulp, paper, chemicals, food processing, clothing, flour and feed, and heavy machinery for logging and transportation. Tacoma is the center of a standard metropolitan statistical area (pop., 1960, 321,590) including all of Pierce County. The city had a 1958 value added by manufacture of \$131,078,000.

EDUCATION AND CULTURAL INSTITUTIONS: Tacoma's public schools enroll ca. 32,000 pupils; the parochial schools ca. 3,700. Among the institutions of higher learning are Pacific Lutheran Coll. and the Coll. of Puget Sound. Cultural facilities include the Tacoma Little Theater, Lake-wood Little Theater, the Tacoma Philharmonic Assn., which sponsors concerts by the Seattle Symphony Orchestra, and the Alaskan and Indian exhibits at the State Historical Society Museum.

GOVERNMENT: Tacoma has had a council-manager form of government since June 1933. The council consists of nine members, elected at large for six-year terms (three of the members are elected every two years). The manager is selected



Courtesy Tacoma Chamber of Commerce

TOTEM POLE IN TACOMA, WASHINGTON

Carved from a cedar 100 ft. high, the totem pole tells the legend of the Eagle tribe of Alaskan Indians

by, and serves at the pleasure of, the council.

HISTORY: George Vancouver (1758-98), a captain in the British navy, was the first white person to visit the present site of Tacoma, in 1792. Charles Wilkes (*q.v.*), commander of a U.S. exploring expedition, began a survey of the waters of Puget Sound in the bay around which Tacoma was built (1841). General M. M. McCarver came to Puget Sound in 1868 looking for a suitable terminus for the Northern Pacific R.R. He platted a town site, calling it Commencement City, and in 1869 he changed the name to Tacoma. A post office was established, with Job Carr, the first settler, as postmaster. The first city government was incorporated in 1884, at which time Old Tacoma and New Tacoma were consolidated.

The population made its greatest gains in the decade 1900-10, from 37,714 to 83,743, or 122 per cent. It rose to 109,408 in 1940, to 143,673 in 1950, and to 147,979 in 1960.

Taconic Mountains (*tā-kōn'ik moun-tinz*), a range of highlands in the eastern part of New York, extending a short distance across the border into Vermont and Massachusetts. These mountains run from the Hudson toward the northeast, assuming their greatest height after they cross the border, and in Vermont merge into the Green Mts. Mount Equinox, in southwestern Vermont, has a height of 3,816 ft., and Greylock, in northwestern Massachusetts, stands 3,505 ft. above sea level.

Tactics (*tāk'tiks*), in general, any planned method of action, especially in the form of a system or devices for the purpose of achieving an end. In military or naval usage, tactics implies the art or science of conducting and maneuvering troops or ships for action or in the presence

of the enemy. Tactics in handling troops or ships usually employs a course of action aimed toward a specific goal. Various branches of fighting forces devise tactics peculiar to their individual needs. Distinguished from the broader term *strategy*, which is the science of military planning on a wide scale for gaining ultimate victory, tactics designates the movements of ships or troops in single engagements.

Tadpole (*tād'pōl*). See *Frog*; *Toads*.

Tadzhik Soviet Socialist Republic (*tāzhik*), or TADZHIKISTAN, an autonomous Soviet republic in Central Asia, created in 1924, occupying 55,700 sq. m. of territory north of India, and separated from that country by a 9-m.-wide strip of Afghan territory. Three-quarters of the population are Tadzhiks, with the remainder mainly Uzbeks, Russians, and Kirghiz. The capital is Stalinabad, with a population of ca. 85,000. The district of the highest Pamir peaks was created in 1925 and is known as the Mountain Badakhshan Autonomous Region. The Pamirs are eternally covered with snow, and contain glaciers which give rise to the great rivers of Central Asia.

The mountain slopes are suitable for pastureland, and the valleys for agriculture. Cotton plantations, vineyards and orchards line the valleys of the Syr-Darya, Vakhsh, and Kafirnigan, Rivers. Much progress has been made in irrigating the Vakhsh Valley. Silk worms are raised widely.

Tadzhik has undergone extensive development as a result of successive "five-year plans." Industries have been founded in Leninabad and Stalinabad, including a large hydroelectric plant and a textile factory. A railroad runs from Stalinabad west to the Caspian railway and another crosses the northern end of the republic near Leninabad and modern highways have been built across the mountains along the Afghan and Chinese frontiers. This republic was formerly one of the territories of the Emir of Bokhara, who served as head of a native state under the czars. Population, ca. 1,500,000.

Taffeta (*tāf'ē-tā*), a name applied to various fabrics, but most commonly to a kind of smooth cloth made of silk or wool. In the 17th century taffeta was very lustrous silk, sometimes checkered and sometimes striped with silver and gold. Taffeta as marketed at present is a thin glossy silk of fine texture, differing from *surah*, which is twilled, and from *grosgrain*, which is corded.

Taft (*tāft*), **LORADO**, sculptor, born in Elmwood, Ill., April 19, 1860; died in Chicago, Oct. 30, 1936. After his graduation from the Univ. of Illinois, in 1879, he studied art at Paris for three years, exhibiting in the meantime several sculptures in the salons. He established himself in Chicago in 1886, where he soon became instructor in sculpture in the Art Inst. Of his numerous works,

many have been praised for their symbolic beauty. Among the most noted are a statue of Schuyler Colfax, now in Indianapolis, a statue of Gen. Grant, and the "Black Hawk" statue in Oregon, Ill. He wrote "History of American Sculpture."

Taft, **ROBERT ALPHONSO**, U.S. Senator, born in Cincinnati, Ohio, Sept. 8, 1889; died in New York City, July 31, 1953. The son of William Howard Taft (*q.v.*), he was educated at both Yale and Harvard. Taft practiced law in his native city. He became a (Republican) member of the Ohio legislature (1921-32), and U.S. Senator in 1939. With the defeat of the Democrats in the Congressional elections of 1946, Taft became the leading Republican spokesman on domestic affairs in the 80th Congress. He was co-author of the Taft-Hartley Labor-Management Relations



Photo by Bachrach

ROBERT TAFT

Act (see *National Labor Relations Act*). He was mentioned as a possible Republican Presidential candidate in 1948, and received 224 votes on the first ballot at the Republican convention but withdrew in favor of Thomas E. Dewey. When the Democrats gained control of Congress in 1949 he retained his chairmanship of the Senate Republican policy committee. He upheld the conservative (sometimes called "coalitionist") position on U.S. foreign policy in the critical period of 1950-51. That his views represented those of his constituents seemed indicated when, in 1950, he was re-elected by a substantial majority.

Taft, **WILLIAM HOWARD**, 27th President of the U.S., born in Cincinnati, Ohio, Sept. 15, 1857; died in Washington, D.C., March 8, 1930. Son of Alphonso Taft, Secretary of State under President Grant, he studied at Yale Univ. and was admitted to the bar in 1880. He



WILLIAM HOWARD TAFT

married Helen Herron in 1881, and won his first appointment to the bench in 1888. From 1892-1900, he served in the Federal Circuit Court, where he enjoined railroad workers from boycotting although he upheld the right to strike. He was chairman of the commission to devise and establish civil government in the Philippines and was the islands' first civil governor (1901-04).

The friendship of Theodore Roosevelt brought Taft a succession of administrative appointments, among them a seat in the cabinet as Secretary of War (1904-05). Roosevelt's support gained Taft the Presidency in 1908, but the strong shadow of Roosevelt made his term in office somewhat less than a happy one. Among other things, Taft had to meet the tariff issue, which he did clumsily, signing an unsatisfactory bill (Payne-Aldrich Tariff Act, 1909) and then attempting to defend it as a measure which fulfilled pledges to reduce rates. Lacking Roosevelt's genius for publicity, Taft could neither eliminate the Progressive wing of his party nor make use of it. When Roosevelt broke with him in 1910, Taft found supporters only among "Big Business" and the professional politicians. Although Taft's administration had produced more anti-trust prosecutions and a greater body of useful legislation than had his predecessor's—postal savings, workmen's compensation laws, the 16th and 17th Amendments, the parcel post system—his administration ended with loss of public confidence in him and a disrupted Republican party.

Taft returned to the law as professor of constitutional law at Yale Univ., served on Presi-

TAGORE

dent's Wilson's War Labor Board, and finally found his true place in 1921 when Harding appointed him Chief Justice of the Supreme Court. In that post, he distinguished himself as an administrator rather than as a leader in judicial thought, but he helped to make the Court function efficiently. His sons are Senator Robert A. Taft (*q.v.*), and Charles P. Taft (born 1897).

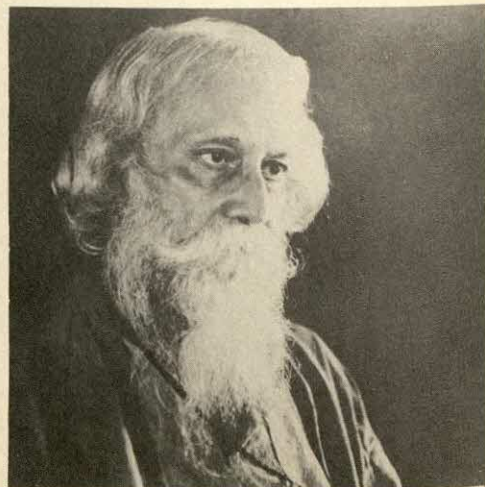
Taganrog (*tà-gân-rôk'*), a seaport city of Russia, in the Caucasus, on the north shore of the Sea of Azov. The surrounding country is highly fertile and is penetrated by several railroad lines which promote the city's large export trade in corn, wheat, livestock, wool, leather, and dairy products. Among the manufactures are machinery, clothing, cotton and woolen goods, hardware, and earthenware. Fishing is an important industry. The city was founded in 1696. Considerable damage was done in 1855 as a result of the Crimean War. During World War II, the city was occupied by the Germans, who used it as a military base. The Russians regained control of it in August 1943. Population, *ca.* 190,000.

Tagliamento (*täl-yä-mě'n'tô*), a river of northeast Italy, originating in the Carnic Alps and flowing 106 m. through Udine Province into the Adriatic Sea, at the Gulf of Venice. In World War I, after their defeat at Caporetto, Oct. 24, 1917, the Italians sought to hold the Austrians at the line of the Tagliamento, but were pushed back to the Piave. In the Italian advance of November 1918, the Austrians were in turn forced to retreat to the Tagliamento.

Tagore (*tà-gôr'*), SIR RABINDRANATH, Hindu writer, composer, painter, born in Calcutta, India, in 1861; died Aug. 7, 1941. Privately tutored in India, he studied law in England. Returning to

RABINDRANATH TAGORE

Courtesy Govt. of India Info. Service, Wash., D. C.



his native country, he began writing both prose and poetry, much of which appeared in Bengali periodicals. He also became well known as an educator and philosopher, establishing a school at Bolpur, Bengal, later internationally famous as Visva-Bharati. His wide travels and lectures and his works made him a world-renowned figure. Recipient of the Nobel Prize in literature in 1913, he was knighted by the King of England in 1915, but resigned the title in 1919 in protest against methods used to suppress uprising in the Punjab.

Less concerned with political reforms than with the social life of his compatriots, Tagore's writings are permeated with a deep, universal love of nature and spiritual beauty, of youth, simplicity, and God. They reflect the serious attitudes of the Bengal people as do his numerous songs and paintings. Among his most outstanding literary productions translated into English are "The Crescent Moon" (1913), "Chitra" (1914), "The Post-Office" (1914), "The Gardener" (1914), "Fruit-Gathering" (1916), "Nationalism" (1917), "The Parrot's Training" (1918), "The Home and the World" (1919), "Red Oleander" (1924), "Broken Ties" (1925), "Letters to a Friend" (1928), "The Religion of Man" (1931).

Tagus (*tā'gūs*), the largest river in the Spanish peninsula, which rises near the boundary of Aragon and New Castile and, after a general course of 452 m. toward the southwest, flows into the Bay of Lisbon, an inlet from the Atlantic. Much of its basin is dry and barren and its banks are precipitous in many places. It is navigable for a distance of 115 m. Among the principal tributaries are the Jarama, Zezere, and Zatas Rivers. Lisbon, Santarem, and Toledo are the chief cities on its banks.

Tahiti (*tā-hē'tē*), the largest of the Society Islands (*q.v.*).

Tahlequah (*tā-lē-kwā'*), county seat of Cherokee County, Okla., 30 m. N.E. of Muskogee. It is located in the valley of the Illinois River midway between the Fort Gibson and Teukiller dams, on the St. Louis & San Francisco R.R., and is surrounded by a productive fruit-farming and stock-growing country. The principal buildings include the Northeastern State Coll. and the Cherokee National Library. The place was settled in 1836 and incorporated in 1889. It was the capital of the Cherokee Nation before that region was united with Oklahoma to form a state. Population, 1940, 3,027; in 1950, 4,750.

Tahoe (*tā'hō*), a glacial lake in the Sierra Nevada Mts., on the boundary between Nevada and California. It is 10 m. wide and 20 m. long, elevated 6,225 ft. above sea level, with a depth of 1,500 ft. The Truckee River discharges the overflow into Pyramid Lake, where the water sinks or evaporates. It has

fine fishing and is favored by tourists.

Tailor Bird (*tā'lēr bērd*), a genus of birds of the warbler family, so named from their habit of sewing leaves with cotton or other substances to form a receptacle for the nest. The nest proper is made of cotton, wool, loose hairs, and twigs, and four eggs are usually laid. These birds include a number of species, most of which are native to the East Indies and Southeastern Asia. The common tailor bird measures about 6 in. exclusive of the tail, which is about as long as the body. The upper part is greenish and the lower part is whitish. It is the most ingenious species in sewing together the leaves, usually taking two leaves at the extremity of a twig and stitching them by passing vegetable fibers through holes made by the bill.

Taine (*tān*), HIPPOLYTE ADOLPHE, critic and historian, born in Vouziers (Ardennes), France, April 21, 1828; died in Paris, March 5, 1893. He studied at the College Bourbon and the Ecole Normale, in Paris. After teaching in the provinces, Taine returned to Paris (1853) to study and write critical essays. After a physical breakdown in 1854, he traveled in England, Germany, and the Pyrenees and later began to participate in the literary life of Paris. Among his friends were the historian F.P.G. Guizot, the philosopher, Ernest Renan, and the critic, C.A. Sainte-Beuve. Among his articles for literary reviews was a famous series on the 19th-century philosophers, which was later (1867) published in book form.

In 1864, Taine was appointed to the chair of history of art and aesthetics at the Ecole des Beaux Arts. That same year, he published "History of English Literature," a work that won him an international reputation. All of Taine's studies

HIPPOLYTE TAINÉ

Painting by Léon Bonnat (1833-1922)



are based on the thesis that man is the product of heredity, environment, and a specific socio-historical situation. Man and society are, therefore, subject to scientific laws of conduct and social change. They can be investigated with the same tools of analysis that govern all other phenomena of nature. The framework of Taine's naturalistic philosophy is lucidly revealed in his study, "*De l'intelligence*" (1870).

After the Franco-Prussian war Taine began the preparation of a monumental historical work, "*Les Origines de la France contemporaine*" (6 vols., 1876-93). As philosopher, critic, and historian, Taine was an outstanding spokesman for the scientific movement of his time. His rigorous application of scientific methodology to the several intellectual disciplines exerted a lasting influence on French thought.

Taipei (*tī-bā*) or TAIPEH, a city in northern Formosa, capital of the island while it belonged to Japan (1895-1945), and then called Taihoku, and capital since 1945 of the province of Taiwan, China. Since 1949 Taipei has been headquarters of the Nationalist Chinese government (Kuomintang). The city's industries include camphor refining, tea packing, and tobacco processing. Its port is Keelung. Population, 1951, 540,971.

Taiiping Rebellion (*tī'pīng' rê-bê'lyūn*). See *China: History*.

Tait (*tāt*), ARCHIBALD CAMPBELL, 92nd archbishop of Canterbury, born in Edinburgh, Scotland, Dec. 21, 1811; died Dec. 1, 1882. Educated at Glasgow and Oxford universities, where he was a tutor and a fellow, he was ordained an Anglican priest in 1836. As an advocate of Low Church views, Tait was an opponent of the Oxford Movement (*q.v.*). Succeeding Dr. Thomas Arnold (*q.v.*) as master of Rugby (1842), he was appointed dean of Carlisle (1849), bishop of London (1856), and archbishop of Canterbury (1869). Possessing a practical bent, he was influential in pressing the passage of many parliamentary measures, including the Public Worship Regulation Act (1874). He wrote "*The Word of God and the Ground of Faith*" (1863).

Tajik Soviet Socialist Republic (*tā-zhīk sō-vi-ēt sō-shā-līst rê-pūb'lik*) or TAJIKISTAN. See *Tadzhik Soviet Socialist Republic*.

Taj Mahal (*tāzh mā-hāl*), a beautiful tomb of white marble near the city of Agra, India, built by Shah Jahan (*q.v.*) for his wife, Taj, or Mumtaz, Mahall. Construction, begun ca. 1630, took almost 20 years. Set in a splendid garden, the mausoleum is built on a platform with minarets at its corners. The building, covering 186 sq. ft., is ornamented with semiprecious stones and capped by a dome. Shah Jahan is buried here with his wife. See also color plate, *Architecture II*, Volume XII.

Tajumulco (*tā-hōō-mōōl'kō*), an inactive vol-

cano in western Guatemala. With an elevation of 13,816 ft., it is the highest mountain in Central America.

Talc (*tāl'k*), a hydrous, magnesium silicate ($\text{H}_2\text{Mg}_3(\text{SiO}_3)_4$), which occurs naturally as talc, soapstone, and steatite rock. It is also known as French talc and, when purified and sold as a dusting powder, as talcum. In color the mineral ranges from white to green and gray. It is smooth, soapy, or greasy to the touch, with a lustrous or waxlike appearance. The talc mineral breaks into plates, cuts without crumbling, and can easily be powdered. On Moh's Hardness Scale (*q.v.*), talc ranges from 1.0 to 1.5, with a specific gravity of 2.5 to 2.9. It resists chemical attack and heat. The mineral is found in crystalline schists and igneous rock as a secondary alteration product of other minerals and is frequently associated with serpentine, magnesite, actinolite, and chlorite. It is found in the eastern U.S., England, Switzerland, Germany, Italy, India, and South Africa. Its many uses include those as fillers for paper, rubber, soap, plastics, cosmetics, paints, and plaster; it is used in lubricating compositions, leather-dressing, linoleum, insulating materials, and in textile finishing. Soapstone, a solid variety of talc, is easily carved, and art objects are frequently made from it.

Talca (*tāl'kā*), a city of Chile, capital of the province of Talca (area, 3,722 sq. m.; population, 1952, 175,708), 155 m. s. of Santiago. Situated on the Claró and Piduco rivers in Chile's central valley, in the center of a grain and wine-producing region, Talca is an important industrial city. The manufactures include matches, shoes, tobacco, paper, flour, wine, and grain. Founded on another site in 1692, Talca was destroyed by earthquake in 1928 and rebuilt. Population (of the city), 1952, 125,325.

Talent (*tāl'ənt*), a unit of weight and money in ancient Greece. The talent as a unit of weight was the highest denomination in the system of Greece, equal to about 82 lb. avoirdupois. A talent of different denomination was used by the Hebrews and Babylonians. As a monetary unit the Greek talent was divided into 60 *minas* and 6,000 *drachmas*.

Tales of Hoffmann (*tālz of hōf'mān*), in French, *LES CONTES D'HOFFMANN*, opera by Jacques Offenbach (*q.v.*), first performed in Paris, France, in 1881, and in the following year in New York City. This work, the only genuine opera of the composer, whose favored field was the operetta, is based on an autobiographical account of the German novelist E. T. A. Hoffmann.

Talien (*dā-lī-ēn'*) or TALIANWAN, the Chinese name of Dairen (*q.v.*).

Talisman (*tāl'is-mān*), a charm which has supposed protective qualities. It differs from the amulet in that the powers of the latter are passive

TALLADEGA

and merely preserve the owner from harm and injury, while the talisman could, for example, subject the elements to him and enable him to pass through the air or over the seas. Supposedly, it not only wards off evil, particularly diseases or wounds, but also brings physical strength, money, and other goods. Such magic powers were sometimes ascribed to the fact that it was prepared under a favorable conjunction of planetary influences. Many talismans, however, have no association whatsoever with astrological signs and phenomena. A talisman ordinarily consists of a piece of metal, stone, or wood engraved with magical signs or formulas, although some talismans were small-scale idols or gods.

The talisman appeared very early in the history of civilization. Sumerians and Babylonians had them around 3000 B.C. and excavations of the oldest Chinese communities have brought talismans to light.

Although from a Christian point of view the belief in talismans must be considered as idolatry (*q.v.*), some traces of the belief can still be found (*e.g.*, the St. Christopher medal carried in some automobiles as protection against accidents). A rabbit's foot, a four-leaf clover, and other objects carried as good luck charms are common talismans.

Talladega (*tāl-à-dē'gā*), a city, county seat of Talladega County, Ala., 60 m. E. of Birmingham, on the Southern, the Louisville & Nashville, and the Atlantic Coast Line R.R.'s. It is surrounded by a fertile farming and cattle-growing country. Large quantities of coal, iron, limestone, and marble are obtained in the vicinity. Located here are Talladega Coll. and the state schools for the deaf and blind. Talladega has manufactures of cotton, textiles, woolen yarns, elastic webbing, furniture, and clothing. General Andrew Jackson defeated a force of Creek Indians here in 1813; about 300 Indians and 100 Americans were slain. Talladega was incorporated in 1835. Population, 1950, 13,134.

Tallahassee (*tāl-lā-hās'sē*), a city, a county seat of Leon County and capital of Florida, 25 m. N. of the Gulf of Mexico, on the Seaboard Air Line R.R. It is surrounded by a fertile farming and fruit-growing region, which yields large quantities of cotton, tobacco, and tropical fruits. The principal buildings include the state capitol, the Walker Memorial Library, the governor's mansion, the Centennial building, the Florida State Univ. and Florida Agric. and Mech. Coll. (for Negroes). Manufactures include lumber products, processed meat, and naval stores. The city became the territorial capital in 1823, but was not laid out until 1824. Near the city are the Killearn Gardens and Wakulla Springs. Population, 1950, 27,152.

Talley (*tāl'i*), MARION NEVADA, opera singer, born in Nevada, Mo., Dec. 20, 1906. She studied



CHARLES DE TALLEYRAND-PÉRIGORD

voice and instrumental music and made her debut as *Gilda* in "Rigoletto" at the Metropolitan Opera, New York, in 1926. In 1932, she married Michael Raucheisen, a German pianist, and the following year joined the Chicago Grand Opera Company, where she scored many successes. Her first marriage was annulled in 1933, and in 1935 she married Adolph Eckstrom. In 1936 she starred in the film "Follow Your Head."

Talleyrand-Périgord (*tāl'i-rānd-pâ-rē-gôr'*), CHARLES MAURICE DE, diplomat, born in Paris, France, Feb. 13, 1754; died May 17, 1838. He studied at the Seminary of St. Sulpice and at the Sorbonne, and in 1780 he was made agent-general of the French clergy. Consecrated bishop of Autun in 1789, he was elected in 1789 to the national assembly, of which he became president in 1790. He suggested the seizure of church property to provide revenue for the government. He was excommunicated by the Pope in 1791, and never resumed his profession.

He was sent on a mission to England in 1792 with the view of effecting a conciliation, but on the fall of Louis XVI was proscribed for intriguing in favor of the Royalists. The alien act required him to leave England and he sailed, in 1794, to the U.S., where he engaged in a number of successful speculations. His name was stricken off the list of exiles in 1796, thus permitting his return to France, where he became minister of foreign affairs. He used that position in favor of Napoleon, who recognized in him a powerful supporter and an able diplomat. It was his influence that reconciled a majority of the Directory to Napoleon and, after its fall (Nov. 10, 1799) he promoted the organization of the consulate.

Talleyrand was again made minister of foreign affairs, and as such furthered the diplomatic schemes of Napoleon. In 1804 the empire was established and he became its grand chamberlain,

and two years later was made Prince of Benevento. Napoleon and Talleyrand became estranged after the Peace of Tilsit (1807), and in 1814 Talleyrand was instrumental in bringing about the abdication of Napoleon. He was rewarded by Louis XVIII with his third appointment as foreign minister. In that capacity he concluded a secret treaty with Austria and England and, when the allies entered Paris, in 1815, he became president of the council. Opposition to the conditions imposed by the allies upon France caused him to resign the office, but he still remained an important advisory factor among leading statesmen. He was offered the position of foreign minister a fourth time in 1830, shortly after Louis Philippe had ascended the throne, but he declined and accepted instead the office of ambassador to London, where he concluded a valuable treaty, but retired finally from public life in 1834.

Tallien (*tā'lyān'*), JEAN LAMBERT, revolutionist, born in Paris, 1767; died there Nov. 16, 1820. He learned the printer's trade early in life, becoming overseer of the *Moniteur* in 1791, and the following year became an editorial writer for a Jacobin newspaper. He was made a deputy to the Convention, where he supported Marat and voted for the execution of the king, and in 1793 became a member of the Committee of Public Safety. As a member of that committee he visited a number of the western provinces of France to oppose the Girondists, and in that capacity caused many of his opponents to be guillotined. He was chosen president of the Convention on March 22, 1794, but there he was denounced by Robespierre, and his name was finally stricken from the list of Jacobins. However, he maintained his influential position among leaders of France until 1798, when opposition forced him to leave the Council of Five Hundred. Subsequently he accompanied Napoleon to Egypt, and after his capture by the English (while on the return voyage) he lived in England for a time. Later he served as consul in Alicante, dying in obscurity.

Tallin (*tāl'in*) of TALLINN (former name, REVAL or REVEL), the capital and a seaport of Estonia, on the Gulf of Finland. It is 238 m. s.w. of Leningrad, with which it is connected by railroads. It has many fine examples of Gothic architecture, including the Cathedral Church, the exchange building, and the Church of St. Clai. It is popular as a summer resort for boating and bathing. The city water is supplied by an aqueduct from Lake Jarvakyla. During World War II many industries, such as railroad shops, harbor works, and flour mills, were destroyed. A factory for producing textile fiber from glass has recently been built. The harbor of Tallin remains open throughout the year. The Germans captured the city by a combined land and sea attack in 1918, and it was the

site of fierce fighting in World War II. Population 1947 (est.), 168,000.

Tallith (*tāl'ith*), Hebrew, a square shawl made of wool or silk, with fringes, worn by male Jews over 13 years of age. Today it is used by orthodox Jews only during the morning prayers, but formerly it was worn throughout the day.

Tallmadge (*tāl'māj*), BENJAMIN, soldier and politician, born Feb. 25, 1754, in Brookhaven, N.Y.; died March 7, 1835, in Litchfield, Conn. He was educated at Yale Univ. and then went to Wethersfield, Conn., as superintendent of the high school. In the Revolutionary War he joined a Connecticut regiment, eventually rising to the rank of colonel. His chief achievement was the capture of Ft. St. George, at Oyster Bay, L.I., in 1780. He was a member of Congress, 1801-17.

Tallow (*tāl'ō*), the product extracted or rendered from the solid fat or "suet," found in cattle, sheep, goats, or horses. Its constituents are largely olein, stearin, and palmitin oils. It is graded into edible and inedible groups, the latter also graded according to purity. Edible tallow is used in food products and in the manufacture of some oleomargarines; inedible tallows as soap stock, leather dressings, fabric-finishing agents, candles; as lubricants for metal-sawing operations, emery wheels, dies; as railway axle grease; in lithography and engraving, and as a source of stearin and oleo oils. Vegetable tallow is a fat obtained from plants, especially from the Chinese tallow tree (*q.v.*). The tallow shrub is the bayberry, whose fruit and bark yield a fat.

Tallow Tree (*tāl'-o-trē*), any of several trees whose seeds produce a substance called vegetable tallow. They include the Chinese tallow tree (*Sapium sebiferum*), the candle nut (*Aleurites moluccana*), the butter-tree of West Africa (*Pentadesma butyracea*), and two other West-African species (genus *Allanblackia*). The Chinese tallow tree is fairly typical of all. A member of the spurge family, and a native of China and Japan, it is grown in tropical regions, including the southern U.S. It is a good shade and ornamental tree, 25 to 40 ft. long, with wide, tapering leaves and small flower spikes. The dry seed capsules each contain three large seeds covered with a thick, hard, white, waxy substance, used, as are the tallows of all tallow trees, in making candles, soap, oleomargarine, and some cosmetics. The seed kernels of the Chinese tallow tree and of the candle nut tree yield drying oils similar to linseed oil. The West-African trees are timber trees as well; their wood is used in making buildings, canoes, masts, and bridge piles. See also *Candle Nut*.

Talma (*tāl-mā'*), FRANÇOIS JOSEPH, tragedian, born in Paris, France, Jan. 15, 1763; died Oct. 19, 1826. He studied in London and Paris and first appeared upon the stage in 1787. At first



FRANÇOIS JOSEPH TALMA

he was not successful in winning favor, but he rose rapidly in public estimation after 1789. For some time he was regarded as the greatest tragedian of his period. He won the friendship of Napoleon, Danton, and other prominent men in France. He was among the first advocates of realism in costume and scenery; it had, before his time, been the custom to play, for example, Roman parts in 18th-century costume instead of in togas. His greatest successes were made in Voltaire's "Mahomet" and Chenier's "Charles IX."

Talmadge (*tāl'mij*), NORMA, motion-picture actress, born in Niagara Falls, N.Y., May 2, 1897; died in Las Vegas, Nev., Dec. 24, 1957. After attending schools in Brooklyn, N.Y., she made her first screen appearance in 1911. From then until her retirement in 1930, she appeared in about 70 silent films, notably in such popular hits as "The Dixie Mother" (her first), "Forbidden City," and "Smilin' Through." Her three husbands included film producer Joseph Schenck and comedian George Jessel.

Talmage (*tāl'mij*), THOMAS DE WITT, divine, born in Bound Brook, N.J., Jan. 7, 1832; died Apr. 12, 1902. He first studied law, later entered New Brunswick Theological Seminary, and in 1856 received a pastorate at Belleville, N.J. Subsequently he held an important charge in Philadelphia and in 1869 was called to a Presbyterian church in Brooklyn, where he attained remarkable success. The church building burned in 1872, but it was soon succeeded by a larger structure, which was likewise burned in 1889, and was replaced in 1891 by a magnificent edifice costing \$400,000. A fire destroyed the last mentioned in 1894 and the next year he removed to Washington, D.C. Many of his sermons were published in the daily papers of America and Europe, and a number of his writings have been widely trans-

lated. He visited Europe and the Holy Land in 1889. He was editor of *The Christian Herald* from 1890 to 1902. His writings include "From Manger to Throne," "One Thousand Gems," "The Marriage Ring," "Sports That Kill," "Sermons," "Around the Tea-Table," and an autobiography.

Talmud (*tāl'mūd*), a Hebrew word meaning study, teaching, instruction, the name of the body of Jewish writings which is, next to the Bible, the most important in Judaism. Developed out of an oral tradition, it represents a written compilation of Jewish religious and civil law. It is divided into two parts which differ as to content and to the time of their origin: the Mishna and the Gemara.

The Mishna, composed of six main parts and subdivided into 63 tractates, is the essence of the Oral Law. It represents a collection of legal writings by Jewish teachers (called Tannaim) up to ca. 200 A.D. when it was codified by Judah Hanasi (died ca. 219). The material is arranged according to subject matter, dealing with laws concerning agriculture, festivals and feasts, marriage and divorce, civil and criminal law, laws relating to the Temple service and those of purity.

The extensive commentary on the Mishna, handing down the teachings and decisions of the Amoraim (derived from the Hebrew word meaning "to speak," used to designate all the Jewish teachers from the death of Judah Hanasi to the completion of the Babylonian Talmud), is the Gemara. The Gemara exists in two versions, known as the Palestinian and the Babylonian. While the Palestinian Gemara contains the discussions and judgments of five generations of Palestinian scholars, concluded about 400 A.D., the Babylonian Gemara records the discussions and commentaries the Babylonian scholars of seven generations had to give to the laws of the Mishna, completed about 500 A.D. Hence, we distinguish between the Babylonian Talmud (Mishna plus Babylonian Gemara), written in Hebrew and Aramaic, and the Palestinian Talmud (Mishna plus Palestinian Gemara) written entirely in Hebrew.

The two principal categories in the subject matter of the Talmud are the Halacha and the Haggadah. The halachic parts, representing the major portion, comprise the law and discussions about the law; the Haggadic part deals with the non-legal matter, transmitting instruction in ethics, philosophy, history, and spiritual elevation. Both subject matters, however, are not clearly separated but are often interrelated.

Neither of the two versions of the Talmud has come down to us in complete form. The oldest manuscript of the Babylonian Talmud, dating from the 14th century, was preserved in Munich, Germany; a manuscript of the Pales-

inian Talmud was found in Leyden, Holland. The external appearance of a Talmud page shows the subject matter in the center, while notes and commentaries frame the margins.

Although we can name approximate dates for the completion of both Talmud versions—the Babylonian being the more detailed and comprehensive—there has almost never been a time in which the Talmud was not a living, important factor for the Jews and Judaism. In its entirety it represents a mirror of mankind's life, discussing and commenting on all phases of existence. Therefore it is understandable that the discussions and commentaries have continued even to the present. The Talmud attracted the comments of great Jewish scholars but also attracted the thinking of non-Jewish theologians. Although Orthodox Jews believe in the Talmud verbatim, with the 19th century a critical study of the Talmud by Conservative and Reformed Jews began, concerning the authenticity of the text, its interpretation, its arrangement and commentaries, etc.

The Talmud, which must be considered one of the greatest literary productions of all times, has become an essential part of Jewish life. During the Middle Ages, when the Jews were forced to live apart from cultural centers, segregated in their ghettos, intensive study of the Talmud was the spiritual nourishment which kept them alive and enabled them to endure their sufferings. Even today, the Talmud represents the principal subject in the curriculum of a traditional education.

Tamalpais (*tām-āl-pīs'*), a mountain of Marin County, California, 15 m. n.w. of San Francisco. Its triple summit, 2,600 ft. high, provides a superb view of the Pacific Ocean, San Francisco Bay, and the surrounding region. Muir Woods National Monument, near the western peak, contains a fine grove of giant sequoias, which are among the oldest of living trees.

Tamaqua (*tā-mā'kwā*), a borough in Schuylkill County, Pennsylvania, 37 m. n. of Reading, on the Little Schuylkill River. It was named for "King Beaver" or "Chief Tamaque," chief of the Turkey Clan of the Delaware Indians, translated "Beaver Stream" or "Running Water." It is served by the Reading and the Central of New Jersey R.R.'s. It is situated in the southernmost part of the anthracite area and coal is its principal product. Manufactures include explosives, perforated plates and screens, ladies' dresses and garments, and a cannery. The area was first settled in 1799, and Tamaqua was laid out as a town in 1829 and incorporated as a borough in 1832. Population, 1940, 12,486; in 1950, 11,508.

Tamarind (*tām'ā-rīnd*), a tropical tree of the bean family, which was originally native to the East Indies, but is now extensively naturalized and cultivated in other warm regions. About

40 species have been described, ranging from shrubs to large trees, but the common tamarind usually ranges in height from 30 to 40 ft. The leaves are alternate and pinnate, the flowers are reddish-yellow, and the fruit consists of a brown-shelled pod from 3 to 6 in. long, containing 3 to 10 seeds. The seeds are used in making a beverage, in cookery, for preserving fish, and for various purposes in medicine. Pressed in syrup or sugar, the pods form the preserved tamarind of commerce. The wood, bark, leaves, and flowers have economic value, and the tree forms a fine ornamental plant. Species native to the East Indies frequently reach a height of 80 ft., and their pods contain more seeds than those raised in the West Indies. Other species are met with in the deserts of Asia and Africa, but these are invariably smaller plants.

Tamarisk (*tām'ā-rīsk*), the name of several shrubs and herbs native to Europe, found chiefly in the region of the Mediterranean. The *common tamarisk* cultivated in gardens grows wild in southern Europe. It is a fine shrub from 12 to 15 ft. high and has light-green leaves and beautiful flowers. When in full blossom, it is one of the most beautiful shrubs, presenting a profusion of small red flowers. Another species, the *German tamarisk*, grows to a height of 8 ft. The branches are upright and the bark is smooth, but the flowers are very beautiful. These plants are popular for ornaments in gardens and parks. Some species of tamarisk attain a height of 30 ft.

Tambourine (*tām-bōōr-ēn'*), an ancient musical instrument of the drum class, consisting of a wooden hoop, one side of which is open and the other covered with a vellum head. Around the hoop are metal plates, which jingle when the instrument is played. The player strikes the head with the fingers, hand, or elbow, thereby producing a rolling sound, and intensifies the musical effect by drawing the fingers or thumb over the skin. Tambourines are popular among the Italians, gypsies, and Basques and are used extensively in folk dancing. A form of these instruments is employed with good effect by the Salvation Army, usually in connection with a drum and cornet.

Tamerlane (*tām-ēr-lān'*). See *Timur*.

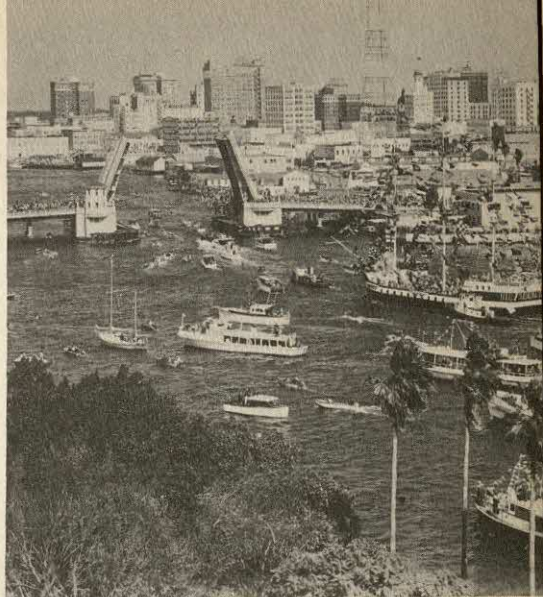
Tamil (*tām'il*), a race of people native to Ceylon and southern India. They are classed with the Dravidian peoples of India. It is supposed that they inhabited the country before it was invaded from the north by the Aryans, whose culture they adopted. Their language is spoken in the northern part of Ceylon and a large part of India. They have an important and extensive literature and many of the writings are in verse.

Tammany Society (*tām'ā-nī sō-sī'ē-tī*), a Democratic organization in New York City, which has long wielded marked influence in the

municipal and state elections. The first organizations, founded in 1789 by William Mooney, was at first known as the Columbian Club, but in 1805 the society incorporated under its present name, which was derived from an Indian chief of the Delaware tribe. Aaron Burr in 1800 placed the society on such a thoroughly organized footing that it controlled New York City politics and gave him the Vice Presidency. The first building was erected by the society in 1811, and in 1822 the power of the organization was given to its general committee. Continued growth increased the committee to 1,400 members, and the chairman finally developed into a boss. William M. Tweed was the most noted of the bosses, but his corruption was finally exposed and he was imprisoned in 1871. When he died in jail in the same year, there was a suit pending against him which the city had brought for the recovery of \$6,000,000. Though crippled for some time, the society soon reorganized and today is influential in the city politics of New York. The society supported Garfield for President in 1880 and thereby defeated Hancock, but its opposition to Cleveland in 1884 did not obtain the vote of New York for Blaine. In 1896 the Tammany Society opposed the candidacy of Bryan, but it supported him in 1900 and in 1908. The organization continued as a dominant factor in both New York City and New York State politics through the first quarter of the 20th century, achieving its crowning triumph with the election of Alfred E. Smith (*q.v.*) as governor of New York and his later nomination for President of the U.S. In 1931, however, the Samuel Seabury (*q.v.*) investigation into New York City government strongly criticized the organization, and its influence has been on a downward trend ever since. A very few New York mayors—Fiorello H. La Guardia, a Republican-Fusionist, and William O'Dwyer (*qq.v.*) and Robert F. Wagner, Democrats—opposed the power of the organization. O'Dwyer forced the resignation of its chairman, Edward V. Laughlin, in 1946, and Wagner succeeded in ousting Carmine De Sapio in 1961. Other prominent Tammany leaders have been Richard Croker, John F. Curry, John Kelly, Thomas L. Leitner, and Charles F. Murphy.

Tammuz (*tām'mōōz*), Hebrew, the 10th month in the Jewish calendar, corresponding to the period mid-June to mid-July in the Gregorian calendar. It has 29 days.

Tampa (*tām'pā*), a city and port of entry in west central Florida, seat of Hillsborough County, at the mouth of the Hillsborough River, on Tampa Bay. It is served by the Atlantic Coast Line and Seaboard Air Line R.R.'s and is the largest port, in tonnage handled, between New Orleans, La., to the west and Norfolk, Va., to the east. The International Airport is ca. 8 m. s.



TAMPA, FLORIDA

A scene in the annual Gasparilla Festival

and MacDill Air Force Base ca. 4 m. w. of the city. Tampa is headquarters of the Florida customs collection bureau.

One of the city's major landmarks is the old Tampa Bay Hotel, located in Plant Park, and built (1891) by Henry Plant (1819-99), founder of a network of railroad and steamship lines in the South. Tampa Bay Hotel was the site of encampment for Theodore Roosevelt's Rough Riders before their embarkation for Cuba during the Spanish-American War. In 1931 the hotel was converted into headquarters for the newly founded Univ. of Tampa. Its main floor houses the Municipal Museum, with exhibits of rare furniture and *objets d'art*. Located on the campus is the famous De Soto Oak, reputedly an early meeting place for Spaniards and Indians. The State Fairgrounds, adjoining Plant Park on the northwest, cover 50 acres and contain some 20 permanent exhibition and administration buildings, a race track, and an athletic field which is used as a spring training field for major-league baseball teams.

The city is part of the Tampa-St. Petersburg standard metropolitan statistical area (1,304 sq. m., 1960 pop., 772,453), including all of Hillsborough and Pinellas counties, which in 1958 had a value added by manufacture of \$235,584,000; the figure for the city of Tampa alone was \$95,840,000.

One of Florida's chief industrial centers, the city leads the world as a citrus-processing center. Its main exports include phosphates, cement, cans and containers, scrap metals, lumber, and chemicals. Important activities are the shipbuilding and shrimp industries. An average temperature of 71.8° F. helps make the city a popular tourist center.

The public-school enrollment is *ca.* 50,000 annually; parochial schools enroll *ca.* 7,000 pupils. Institutions of higher learning include Florida Christian Coll., Tampa Univ., and Univ. of Southern Florida.

Cultural facilities include a philharmonic orchestra, a civic ballet, a little theater, a theatrical society, the Civic Music Assn., the Sun State Opera Federation, and an art institute.

Tampa is governed by a mayor and a board of seven representatives elected at large for terms of four years each.

The Spanish explorer Panfilo de Narváez landed at or near the site of Tampa in 1528 and in 1539 members of Hernando De Soto's expedition came ashore. But it was not until 1823, when the U.S. government established Ft. Brooke, a major base of supplies during the Second Seminole War (1835-43), that settlement was begun. This settlement was named Tampa in 1834 and was incorporated as a city in 1855.

In 1880 the city's population was 720, in 1900, 15,839, and in 1930, 101,161. Its decade of greatest growth was between 1950, when the population was 124,681, and 1960, when it had reached 274,970.

Tampa Bay, an extensive inlet from the Gulf of Mexico, on the west coast of Florida. It is 38 m. long and from 6 to 15 m. wide. The northern part is divided into Old Tampa Bay and Hillsborough Bay. Within the bay are numerous small islands, and at its entrance, on Egmont Key, is a light-house. Marketable fish and turtles abound in the bay, and it is important as a spacious harbor. Port Tampa, on its northern shore, is the chief port.

Tampico (*tām-pē'kō*), a seaport city of Mexico, in the state of Tamaulipas, about 225 m. N. E. of the city of Mexico. It is situated near the mouth of the Panuco River, about 5 m. from the Gulf of Mexico, and has convenient railroad connections with the interior. The harbor is made unsafe by sand bars; but jetties enable vessels drawing 24 ft. of water to enter. The city has many modern improvements and extensive export trade. Prime exports are tallow, hides, and fish. Population, 1940, 81,334; in 1960 (est.), 119,500.

Tana (*tā'nā*), a river of British East Africa, which rises in the southwestern slope of Mt. Kenya and discharges into the Indian Ocean. In the upper course it has many falls and cataracts, but the lower part passes through alluvial plains. A bar obstructs it at the entrance, but it is navigable for about 350 m. during the rainy season. The entire length of the river is 500 m.

Tanager (*tān'ā-jēr*), a family of passerine birds belonging to the finch family. They are native to the warmer regions of America. The species number fully 300, most of which are noted for their brilliant plumage and fine colors. The hues include mainly beautiful shades of orange,

scarlet, and black. A large number of the species are birds of fine song, particularly the *organist tanager*, a bird found largely in Central America. Some of the species visit the warmer parts of the U.S., frequenting places as far north as Massachusetts. They are shy and cautious, and their nests are built in places safely isolated from dwellings. A species known as the *summer redbird* is about 7 in. long and has a wingspread of 12 in. The *festive tanager* has a parrot-green plumage.

Tanagra (*tān'ā-grā*), an ancient Greek city famous for its characteristic terra-cotta statues of small size executed largely during the 4th and 3rd centuries B.C. They depict in a charming way almost all phases of the daily life of ancient Greece.

Tananarive (*tā-nā-nā-rēv'*) or TANANARIVO. See *Antananarivo*.

Tancred (*tāng'krēd*), Italian prince, born in Sicily in 1078; died in Antioch in 1112. He was the son of the Marquis Odo the Good and of Emma, sister of Robert Guiscard, and became distinguished as a leader of the first Crusade to the Holy Land, particularly at the siege of Nicaea in 1097, at the Battle of Dorylaeum in the same year, and at the capture of Jerusalem in 1099. He was a claimant to the throne of Jerusalem, but when that honor fell to Godfrey de Bouillon he was made Prince of Galilee. Subsequently he defended the Christian cause at Antioch and in various parts of Asia Minor. He expelled the Saracens from Syria, and settled several quarrels among the Christian princes in Palestine. Tasso represents him as the flower of chivalry in his famous poem, "Jerusalem Delivered."

Taney (*tā'nī*), ROGER BROOKE, jurist, born in Calvert County, Maryland, Mar. 17, 1777; died Oct. 12, 1864. He was graduated from Dickinson Coll. in 1795, and four years later became a member of the Maryland bar. In 1799, he was elected a member of the house of delegates, served in the State senate from 1816 until 1821, and two years later began law practice in Baltimore. President Jackson appointed him Attorney General of the U.S. in 1831. He was made Secretary of the Treasury in 1833, and in that capacity supported Jackson in removing the deposits from the U.S. Bank to local banks, but the Senate would not confirm his appointment, though the deposits had already been taken from the bank. The President nominated him in 1835 to succeed Chief Justice Marshall on the supreme bench, and the appointment was confirmed the following year. His decision in the Dred Scott case (*q.v.*) attracted wide attention.

Tanganyika (*tān-gān-yē'kà*), one of the great lakes of tropical Africa, situated between Tanganyika and the (former Belgian) Congo. It stretches in a direction from southeast to northwest, has a length of 450 m. and an average width of 30 m., and its surface is 2,536 ft. above sea level. Tanganyika has an area of about 12,700 sq. m. and

a depth of 4,708 ft.; after Lake Baikal in Asia, it is the deepest fresh-water lake in the world. The basin is a deep depression between hills and mountains, though the western coast is somewhat the higher and the eastern portion is partly in the Great Rift Valley. Numerous rivers flow into it, but they are not large streams. The outlet is by the Lukuga River into the Congo. Speke and Burton discovered this lake in 1858, and extensive explorations were made soon after in its vicinity. In ordinarily dry seasons, the evaporation equals the inflow, when the Lukuga ceases to discharge, but, in the wet period, there is a considerable outflow. Vast and valuable forests abound in the vicinity of the lake, and on its eastern shore is the town of Ujiji, the most important in that region.

At Ujiji in 1871, Dr. Livingstone was found by the explorer Stanley, who had been commissioned to discover his whereabouts. Other important towns are Sumbu, Niamkolo, Kasango, and Kigoma in British territory, and Usamburu, Uvira, Albertville, Vua, Baudoinville, and Moliro in Belgian territory. Steamers can ply the length of the lake in four days. Kigoma is the terminus of the East African Central R.R. from Dar es Salaam on the Indian Ocean. Another line extends down the Lukuga Valley from Albertville. In 1962 the shores of Lake Tanganyika were divided among the newly independent countries of Tanganyika (formerly a trust territory of Great Britain), Rwanda and Burundi (formerly the Belgian trust territory of Ruanda-Urundi), the Congo (Léopoldville), and the British protectorates of Northern Rhodesia and Nyasaland.

Tanganyika (*tān-gān-yē'kə*), an independent state in Africa, a member of the (British) Commonwealth of Nations, bounded on the E. by the Indian Ocean, on the S. by the Portuguese province of Mozambique, on the S.W. by Nyasaland and Northern Rhodesia, on the W. by the Congo (Léopoldville), on the N.W. by Rwanda and Burundi, and on the N. by Uganda and the British protectorate of Kenya. Tanganyika includes Mafia Island and embraces an area of 361,800 sq. m., of which about 23,000 sq. m. is inland water.

The coastal plain extends inland about 20 m., then rises to meet the Central African plateau, with an elevation of ca. 4,000 ft. To the west is the Great Rift Valley, in which lie Lakes Tanganyika and Nyasa. In the northeast is Mt. Kilimanjaro, over 19,000 ft., highest peak in Africa. The climate progresses from the tropical coastal lands, to the hot and dry central plateau, to the semitemperate mountainous regions. The vegetation of the coastland includes mangroves, coco palms, and banana trees; much of the country's central region is open woodland or bush and thicket.

Tanganyika's major activity is agriculture, most

of which is food crops for local consumption. The most important sale crops are sisal, cotton, coffee, tobacco, pyrethrum, and oilseeds and nuts. Because of widespread infestation by the tsetse fly, livestock raising is limited to about one-fifth of the territory. Among minerals exploited to some extent are diamonds, gold, and lead; others are mica, tin, and tungsten. There are almost 29,000 m. of roads and over 1,500 m. of railroads, as well as shipping lines and air services.

Colonization of the country began with the Arabs from Oman in the 8th century A.D. In 1884 Germans, under Dr. Karl Peters, took Tanganyika for the German East Africa Co. In World War I, native troops under Paul von Lettow-Vorbeck raided far into British and Portuguese territory but were pushed south of the Rufigi River by Gen. Jan Christiaan Smuts (*q.v.*), and Von Lettow-Vorbeck capitulated in 1918. In 1919 Great Britain received a League of Nations mandate for the territory, except for the 20,550 sq. m. of Ruanda and Urundi, which went to Belgium as a mandate. Portugal retained the Kinonga Triangle south of the Rovuma River, which Germany had occupied some years previously. In 1946 Tanganyika became a British trust territory under the U.N. Great Britain granted the franchise to Tanganyikans in 1957, and in the following two years the first elections were held. In May 1961 the territory entered on internal self-government, and on Dec. 9 it became an independent state. It joined the U.N. as the 104th member on Dec. 14, 1961, and on Dec. 9, 1962, became a republic, although remaining in the Commonwealth of Nations.

The estimated population in June 1960 was 9,238,000, of whom 9,099,000 were Africans, 22,000 were Europeans, and 117,000 were of other nationalities (mainly Asian). The African population comprises 120 tribes, of which the largest is the Sukuma. The chief languages are Bantu and Swahili.

Tangerine (*tān-jē-rēn'*), a kind of orange grown for the market, so named from Tangier, Morocco. The color is a deeper yellow than that of the orange, and in form it is somewhat flattened. The pulp is sweet and juicy and is easily separated from the peel. Large quantities are grown in the states bordering on the Gulf of Mexico.

Tangier (*tān-jēr'*) or TANJA, a seaport city of Morocco, near the western entrance of the Strait of Gibraltar, about 14 m. E. of Cape Spartel. It occupies a fine site on the Bay of Tangier, overlooking the strait. Tangier is the ancient Tingis and was founded by Carthaginians, later becoming a Roman possession. Charles II of England received it as the dowry of the Infanta of Portugal in 1662, but the expense of maintaining the government resulted in its abandonment in 1684. It was besieged and bombarded by the French in 1844. A Franco-German agreement of 1911, and a Franco-

Spanish agreement of 1912, made Tangier an international zone. By a convention of Dec. 18, 1923, and a protocol of July 1925, between Great Britain, France, and Spain, Tangier was guaranteed permanent neutrality, security, and internationalization. It came under the sovereignty of the sultan of Morocco, whose local representative was a high

WORLD WAR I TANK

Courtesy Wide World Photos



Official U. S. Army Signal Corps Photo

TANK DESTROYER HALF-TRACK WITH 75-MM. GUN



U.S. Army Photo

M-60 FULL-TRACKED COMBAT TANK

Moorish official known as the mendoub. As a result of Spanish agitation for full control of the international zone, an accord giving Spain full police powers in Tangier was signed on July 25, 1928. On June 14, 1940, Spanish troops occupied the international zone under the pretext of guaranteeing its neutrality. In 1941 Spanish officials ousted the mendoub, but at the end of World War II new international agreements, to which the U.S. was a party, were made, resulting in a strong limitation of Spanish power in the zone. In 1956 the international status of the Tangier zone was abolished by an international treaty, but its former economic status was not materially changed after its incorporation into Morocco.

Population (mostly Moslems), 1955, 183,000.

Tanglewood (*tāng'g'l-wōd*), a locality near Stockbridge, Mass., where the Berkshire symphonic festival is held annually. The concerts are sponsored by the Boston Symphony Orchestra (*q.v.*). See also *Stockbridge*.

Tango (*tāng'gō*), a slow ballroom dance step in a duple meter maintained against a frequently syncopated melody. It is thought to have developed out of earlier West Indian dances such as the habanera and tangano. It was very popular in Argentina about 1910 and subsequently in Europe and the U.S., although it met opposition in the latter country from some who found it suggestive. It is not related to the Spanish tango, a flamenco dance of Spanish gypsies.

Tank (*tāngk*), an armored, highly mobile, track-laying vehicle, for use in warfare. Equipped with caterpillar treads, tanks are able to negotiate rough terrain and to operate on by-ways normally impassable to wheeled vehicles. Tanks are armed with both machine guns and high-velocity cannon. The first tank was introduced into warfare in 1916 when the British used it in the Battle of the Somme. Tanks have many uses, foremost among them being pursuit and exploitation, raiding, reconnaissance, and support of the infantry. The armored division, the striking force of which is its tanks, has almost completely replaced the cavalry division on the modern field of battle. There are also amphibian tanks, designed for amphibious operations and for crossing rivers. See also *Troops, Mechanized*.

Tanker (*tāng'kēr*). See *Merchant Marine; Ship*; also color plate, *Merchant Vessels Through the Centuries*, Volume XI.

Tannenberg (*tān'en-bērēk*), a village in the former province of East Prussia, Germany. In World War I, 230,000 Russian troops advanced in this region against 135,000 German troops commanded by Gen. Paul von Hindenburg (*q.v.*); between Aug. 26 and Aug. 31, 1914, the Russians lost ca. 50,000 men killed or wounded and ca. 90,000 prisoners. The Russians abandoned their

offensive against Königsberg and retreated across their own border. As a result of this victory, Hindenburg was made a field marshal in November 1914, and promoted to commander-in-chief of the German Army. The huge war memorial, erected at Tannenberg after World War I, houses the remains of Von Hindenburg.

Tannhäuser (*tân'hoi-zēr*), or TANHÄUSER, the subject of a favorite German legend of the Middle Ages. He is represented as a knight traveling to become acquainted with the beauties and wonders of the world. Upon reaching the Venusberg, or Mountain of Venus, he entered the cave palace of Lady Venus, and lived at her court in great pleasure until he became conscience-smitten. The voice of the Virgin Mary commanded that he make a pilgrimage to Rome to ask remission of his sins by Pope Urban. His sins, however, were of such magnitude that the pope declared it quite as impossible for him to be forgiven as for the wand he carried in his hand again to assume life and bear buds and leaves. The knight returned in dire despair to Venusberg, but the pope shortly found that his wand was actually sprouting and beginning to grow. The pope took this as a sign from God that the knight still had an opportunity for salvation, and accordingly he sent messengers to all lands in search of him, but the lost knight could be found nowhere. Richard Wagner based his opera "Tannhäuser" on this legend, and Tieck and other poets treated it in song and sonnets.

Tannin (*tân'in*), or TANNIC ACID, the name applied to certain astringent substances occurring in the bark and other parts of plants. They are widely distributed in various forms throughout the vegetable kingdom. These substances possess the property of coagulating albumen and gelatin and forming dark-colored precipitates with salts of iron. They occur in large quantities in oak bark and to a lesser extent in that of hemlock, willow, elm, pine, and chestnut. Tannin is derived from the bark of the plum, pear, and other fruit trees. Forms of tannin occur in the bark of the sumac and the whortleberry. It is found in the leaves of the ash tree and several allied plants. Coffee, tea, and other substances contain a certain amount of tannin. It has many important uses in the arts and trades, particularly for tanning or converting the skins of animals into leather. This operation depends on the formation in the skin of an insoluble compound of tannin and the albuminoid matter of the skin. The tannin employed mostly is derived from oak and cinchona bark, which is ground to a coarse powder and piled in alternate layers with the skins in deep vats. The vats are then filled with water and the skins are allowed to soak for a few weeks or months, until they have become penetrated by the tannin.

Tanning (*tân'ing*). See *Leather*.

Tansy (*tân'zŷ*), a coarse perennial plant of the composite family. It is native to Europe and Asia, but has been naturalized in North



TANSY

America, where it grows as a common weed along the roadside. It attains a height of 2 to 3 ft., bearing finely dissected leaves and rayless heads of yellow flowers. All parts of the plant are strongly aromatic and bitter, which circumstance has led to their medicinal and culinary use. The oil of tansy is highly poisonous. Under medical advice it may be taken as a remedy in dropsy and for worms.

Tantalus (*tân'tà-lŭs*), in Greek mythology a son of Zeus and father of Niobe. He was also king of Lydia (in Asia Minor). He offended the gods in some way and is known principally for the punishment that was decreed for him. He was forced to stand forever in the river Tartarus whose waters receded as he tried to drink, while fruits which he could not reach dangled from trees above him. His story is found in Homer, Pindar, and Euripides (*qq.v.*) The verb *tantalize* derives from his name and legend.

Tantra (*tân'trà*), the name of a Sanskrit book that treats of a religious ceremony, relating chiefly to the worship of Siva, or of Sakti, the female principle. Several works of this class of literature are extant. They deal with the creation and the destruction of the world, lay down a ceremonial form for the worship of the gods, and contain prayers and rituals. One of the leading Hindu commentators mentions not less than 65 Tantras. Collectively they are considered as a fifth Veda, though they are much more recent. The followers of the Tantras, called the *Tantrikas*, worship by means of mystical rites.

Taoism (*tou'iz'm*), a form of religious worship in China, based upon the teachings of Lao-tse, a scholar of the 6th century B.C. The religion probably existed from prehistoric times, but no authentic information regarding it can be traced back beyond the time of Lao-tse, an official who appears to have given it definite form and made it popular. See *China*; *Lao-tse*.

Taos (*tă'ôs*), a village and Indian pueblo of northern New Mexico, the county seat of Taos County, situated about 8 m. E. of the upper Rio Grande River. The village itself is a famous artists' colony, noted for its charm and old-world atmosphere. The Taos Indians, belonging to the Tanoan stock, represent part of the ancient pueblo culture, basically unchanged since first discovered by the Spaniards over 400 years ago. They numbered 824 in 1942, and are primarily agricultural.



Courtesy Santa Fe Railway

TAOS PUEBLO IN NEW MEXICO

ists, living in square adobe (mud) houses with flat roofs, built one upon another with air-vents in the ceilings for escaping smoke. The population of Taos village, which is made up of three communities, was 965 in 1940; 1,815 in 1950.

Tapajos (*tā-pā-zhōs'*), a river in Brazil, which rises by two branches near the boundary of Bolivia, and, after a course of 1,100 m. toward the northeast, joins the Amazon near Santarem. It is formed by the junction of the Arinos and Juruena Rivers, and a short distance below the junction are a number of important falls, some of them 20 to 30 ft. high. The greater part of the main channel is navigable, and in its lower course is a lakelike expansion, which in some places widens to 12 m. The Arinos River has its source only 18 m. from the Paraguay, both rivers rising in a diamond-producing district. The valley is highly fertile and contains fine forests.

Tapestry (*tāp'ēs-trī*), in applied arts, a term signifying decorated hangings, spreads, or covers of furniture. The motifs used for tapestries are either pure design or pictorial representations of men, animals, scenes, and landscapes. Hand tapestry is a form of needlework, partially woven, in which woolens, silks, and metal threads are worked into the meshes of a basic fabric. The short ends of the threads are knotted at the back of the tapestry.

In many European countries beautiful tapestry was made for monasteries and churches by noble ladies, who engaged in the art largely for the sake of occupation and benevolence. The loom for making tapestry was introduced in the 9th

century, after which much of the work was done by machinery, although the rare and beautiful designs are still hand-made. Tapestry of Flemish manufacture in the 14th and 15th centuries was very highly regarded, which fact gave rise to the large enterprises devoted to its production at Bruges, Antwerp, Brussels, and other cities. The art was not introduced in England until the reign of Henry VIII, but there were manufactures of considerable importance in France, Germany, and other continental countries long before. France was celebrated for the production of tapestry in the time of Louis XIV, when the celebrated Gobelin factory flourished in Paris. A variety of woven fabrics having a multiplicity of colors in their design is commonly but inaccurately called tapestry. Tapestry carpets belong to this class. Tapestries are produced mechanically in modern times, often imitating ancient patterns. Although in some cases they may be rather decorative, they do not have any actual artistic value. However, in many places peasants and farmers still produce tasteful tapestries of simple folk design on their hand looms. See also *Bayeux Tapestry*.

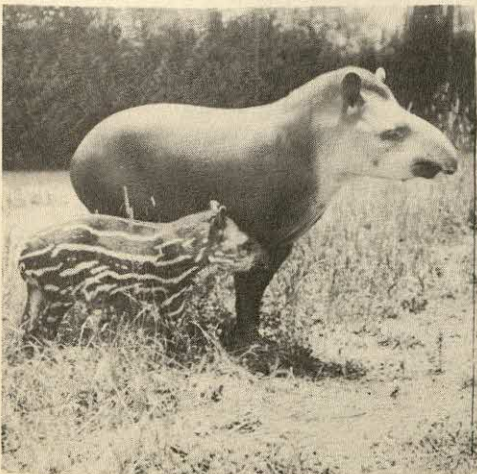
Tapeworm (*tāp'wūrm*), the common name of a class of parasitic worms infesting the alimentary canal of vertebrates. They have no mouth or alimentary canal, but live by absorbing the juices of the animals they infest. The length varies from 5 to 15 yds., and the typical species are ribbonlike, varying in breadth from two lines at the narrowest part to five at the broader end. At the narrow end is the head, which is supplied with suckers or hooks for adhesion, and a row of segments constricted off from it increase progressively in size toward the posterior. The larger tapeworms have several hundred segments, each budded off from the head, the oldest being farthest from it. Each segment matures male and female organs, and, when it is developed, breaks off and is expelled from the bowels. To develop a new tapeworm, it is necessary that the matured segment be swallowed by some warm-blooded vertebrate. This may occur by drinking water or eating contaminated animal flesh.

When the buds are swallowed, the fertilized ova develop into hooked embryos, which bore through the alimentary canal into the tissues, or into the blood vessels, and pass from the latter with the blood to the brain, liver, or other organs of the body, where they surround themselves with cysts containing a fluid and become bladder worms. The head is developed from the bladder worm, but is not capable of further development until it is swallowed by the proper host. Different species of tapeworms are found in the muscles of the ox, in the brain of sheep, and in the muscles of hogs. The *broad* or *Swiss tapeworm* inhabits certain fish, as the pike and turbot. In some cases

persons infested by a tapeworm experience no inconvenience, but usually there is pain in the stomach, continual craving for food, faintness, and restlessness, and itching in various parts of the body.

Tapioca (*tăp-i-ō'kă*), a nutritious, starchy food derived from the large, tuberous roots of the cassava or manioc plant. The juice is obtained by pressing the roots and allowing the starch to deposit at the bottom of a vessel. *Cassava starch* being thus separated from the fibrous constituents, it is spread upon iron plates while in a moist condition and, under the application of the heat, the starch granules become partly ruptured and agglomerate into irregular pellets. In this condition the starch forms the tapioca of commerce and is employed largely in making puddings and as light, nutritious food for invalids. The portion of the root remaining after the starch has been extracted is ground to a pulp and used in warm countries to make manioc or cassava bread, which is eaten largely by natives in the West Indies, Brazil, and the East Indies, where tapioca is manufactured in large quantities. Various species of the cassava-plant are grown. Some species yield tubers weighing 20 to 30 lbs.

Tapir (*tă'pēr*), a class of hoofed quadrupeds, having a bulky body and moderately long legs. In appearance they somewhat resemble the hog, but the legs are longer and the nose is not fitted for digging in the soil. The snout is prolonged into a proboscis. The skin is thick and covered with short but close hairs, the tail is short, the ears are small, and the neck is clothed with a short, stiff mane. Tapirs have four toes on the fore feet and three on the hind ones. They are found in large numbers in South America, ranging from the Isthmus of Panama to the Strait of



Courtesy N. Y. Zoological Society

TAPIR AND YOUNG

Magellan. The color of the South American tapir is brown, and the size is about that of a small ass. The flesh is eaten by natives, the meat being considered quite nutritious. When pursued by jaguars, tapirs rush to the water and find safety in diving. The tapirs of Malaysia and Sumatra are larger than those of South America, the body being 7 to 9 ft. long. They are easily tamed and domesticated, when they become quite gentle. Living representatives are not found in Europe, but fossil remains are abundant, some of them approximating the elephant in size.

Tar (*tär*), an oily liquid obtained by the destructive distillation of organic substances, such as coal, wood, shale, and peat. The two principal classes sold in the market are *wood tar* and *coal tar*. The former is the product of the special distillation of several varieties of wood, and the latter is a primary by-product of the distillation of coal for the manufacture of illuminating gas. Large quantities of tar are made in the forests of North Carolina, and to some extent in other states. The usual plan is to excavate a shallow hole near the upper side of an embankment of a hill, into which the wood is piled in conical heaps, after being cut into sticks about 3 or 4 ft. long and several inches thick. It is then covered with damp soil and fired, the tar being melted out of the wood while it burns slowly. It is then collected in a large cast-iron can below, from which it is conducted through spouts into barrels. It requires two or three weeks to complete the burning of a large kiln, and 15 to 18 per cent of the wood is converted into tar. Pitch pine and fir trees are used extensively in tar making, but the better trees are used in manufacturing turpentine, while the older and inferior classes are picked for tar making. In Sweden, which produces large quantities of wood tar, the trees are partly stripped of their bark several years before they are cut down, as this increases the quantity of resinous matter.

Wood tar is used chiefly for coating the planks and cordage of ships, in making tar paper, in constructing tar pavements and tar roofs, for protecting iron work from the weather, etc. Coal or mineral tar was first manufactured in the latter part of the 18th century, though only to a limited extent. When coal gas came into general use, however, it became much cheaper and was used a great deal more extensively. The tar resulting in the manufacture of gas was first produced in such large quantities that it could not be disposed of successfully, but since then it has become valuable to the industries as a fuel and as a source of products such as benzene, toluene, naphthalene, anthracene, phenol, cresol, and many other commercially important compounds.

Taranto (*tä'răn-tō*), a city in the southern

part of Italy, at the northern end of the Gulf of Taranto, 45 m. s.w. of Brindisi. It is situated on an island, which was formerly a peninsula, and is separated from the Gulf of Taranto by the Little Sea. The harbor is one of the best in Italy, and admits the largest vessels. It has railway facilities, well-paved streets, electric lighting, and electric street railways. The principal buildings include the Cathedral of St. Cataldo, an episcopal palace, the castle, and the public library. Among the chief manufactures are cotton and linen goods, macaroni, canned and cured fish and oysters, and olive oil. The city was founded by the Greeks about 707 B.C. and was formerly known as Tarentum. It became the leading Greek city in Italy and remained independent until 272 B.C., when it was captured by the Romans. Hannibal took possession of it in the Second Punic War, but it was later retaken by the Romans. There are still traces of several temples and an amphitheater. The city was captured by the Allies in 1944 during World War II. Population, ca. 100,000.

Tarantula (*tà-rân'tû-lâ*), or TARENTULA, a species of spider native to Southern Europe, especially to the warmer parts of Italy. It is so named from Taranto, Italy, where tarantulas occur in considerable numbers. The body is elongated, being a little more than an inch in length, and the color is brownish. This spider belongs to the hunting class and displays remarkable ingenuity in running down its prey. The bite was formerly thought to produce the disease called *tarantism*, but it is now known to be no more dangerous than that of a common wasp. A class of hairy spiders, known as tarantulas, are native to Texas and other Southern states. The body is large and the bite is quite poisonous. A species known as *digger wasp* is an allied form and is peculiar for making deep holes in the ground, which it lines with silk and covers with webs. The females carry their young on the back.

Tarapacá (*tâ-râ-pâ-kâ'*), a province in northern Chile, which is of vast importance because of its extensive deposits of saltpeter. The area is 21,340 sq. m. Iquique is the capital and principal seaport. A railroad line extends from the capital to the saltpeter deposits 20 m. inland. Vast reducing works are maintained at various points, largely by foreign capitalists. Nearly all the inhabitants are dependent upon the saltpeter and silver mining industries. Formerly the region belonged to Peru, but it was deeded to Chile in 1884. Population, ca. 105,000.

Tarawa (*tâ-râ-wâ*), a small island in the Pacific Ocean, belonging to the Gilbert Islands, 2,225 m. N.E. of Canberra, Australia. The island has an area of about 90 sq. m. and is a possession of Great Britain. It is exceedingly barren, producing little but coconut palms. The inhabit-

ants are almost solely Polynesian. The island has a leper station, a mental institution, and a government school for native boys.

During World War II Tarawa served as one of the major hopping-off places for Allied attacks against the Japanese mainland. It was the first island to be taken in a modern sea-borne assault, resulting in the costliest battle in the history of the U.S. Marines. In four days of fighting, from Nov. 20 to 24, 1943, U.S. casualties totaled 2,500, while Japanese casualties totaled 4,000. Population, ca. 2,500.

Tarbell (*târ'bêl*), IDA MINERVA, author, born in Erie County, Pennsylvania, Nov. 5, 1857; died



Photo by A. C. Johnston, courtesy Macmillan Co., N. Y.
IDA M. TARBELL

Jan. 6, 1944. She studied in the high school at Titusville and at Allegheny Coll., and for some years was assistant editor of *The Chautauquan*. Her books include "Early Life of Abraham Lincoln," "Short Life of Napoleon," "History of the Standard Oil Company," "Life of Abraham Lincoln," "Life of Madame Roland," "Life of Judge Gary," and her autobiography, "All in the Day's Work."

Tare (*târ*), the name of several species of plants native to the Northern Hemisphere. They belong to the pea family and are known as *vetch* in some localities. The root is annual, the leaves are oblong, and the climbing stem grows to a height of 3 ft. The flowers are usually in pairs, either red or purplish, and the seeds are nutritious. Several species are grown extensively in Europe as feed for cattle and horses. They thrive best in a rich sandy soil, but are frequently sowed for green manure in tracts that need fertilizing. Mention is made of the tare in Matthew 13:36, but the word there probably refers to the dandelion.

Tarentum (*tâ-rên'tûm*), a borough in Allegheny County, Pennsylvania, 20 m. N.E. of Pitts-

burgh. It is on the Allegheny River and the Pennsylvania R.R., has diversified manufactures, and is surrounded by an agricultural region. It was laid out in 1829 and incorporated in 1842. Population, 1940, 9,846; in 1950, 9,540.

Target Shooting (*tär'get shōō'tīng*), the practice of shooting at a mark in order to test or improve marksmanship. The origins of the sport of target shooting with firearms are obscure. A German pamphlet published in 1487 indicates that organized target-shooting clubs were established by that time. Records of the Geneva Shooting Society (*Société de l'Harquebuse de Genève*) show that as early as 1474 archers and harquebusiers competed for prizes; indeed, there has been a continuous succession of "Kings of the Harquebuse," as their annual champions are called, from 1474 to the present. The Swiss National Museum contains a target-shooting trophy, originally competed for by the members of a shooting society in Zurich in 1646. This ancient society, at least as old as that in Geneva and claiming to be older, still holds regular target-shooting tournaments. A stained-glass window (*ca.* 1525) in Zurich depicts a gunner shooting at a target with a round black bull's-eye. At one side of the target is shown a shelter for the target marker exactly like those on some modern small ranges.

The date when rifling was introduced is not certain. Rifled arms are, of course, much more accurate than the smooth-bore variety. Target shooting was sufficiently well organized in Switzerland by 1563 for the town council at Berne to order that rifled arms must not be used in competition with smooth-bores but that special prizes would be awarded for each class.

The National Rifle Association of Great Britain was organized in 1859 and similar national associations were subsequently formed in all of the colonies which now form the British Commonwealth of Nations. In 1903 the Society of Miniature Rifle Clubs was organized in Great Britain by Earl Roberts to promote .22-caliber shooting.

In Russia the Soviet government lavishly sponsored target-shooting clubs between 1925 and the outbreak of World War II.

The Germans, having suffered severely from American rifle marksmanship during World War I, undertook the organization of target-shooting clubs on an extensive scale after 1918. Under Hitler, the rifle club idea was neglected as "old-fashioned." Within six months after the German army had invaded Russia, however, and had encountered the target-shooting Russians—men and women—Hitler hastily ordered the organization of target-shooting clubs throughout Germany.

The rifle was not yet taken seriously in England around 1600. The earliest settlers in the

American colonies, therefore, had only the smooth-bore musket, shotguns, and the cheap, inefficient "blunderbuss."

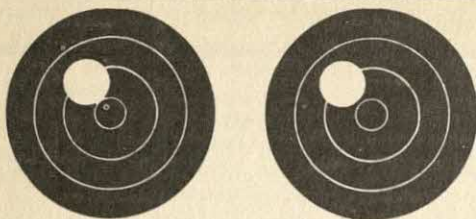
Early in the 18th century, however, groups of Germans and Palatinate Swiss settled in the area around Lancaster, Pa., bringing with them their rifles, their interest in target shooting, and their great skill as metalworkers and woodworkers. Target shooting was an important part of their recreation. Their rifles were heavy, ornately stocked, beautifully fitted with double-set or single-set triggers, palm rests, and great hooked butt plates which fitted under the armpit and under or over the shoulder in order to steady the heavy weapon as it was fired in the standing position. Their shooting clubs were called "*Schützenverein*" and as their peculiar type of rifle became generally known to Americans it came to be called the "*Schützen*" rifle, still so known.

The heavy, ornate, slow-to-load German rifle was not well suited to the requirements of the frontiersman but its accuracy was of the utmost importance. He must travel light. His rifle must therefore be as light as possible. Lead was heavy. Powder was hard to carry and difficult to keep dry. For these two reasons the "long hunter" wanted maximum accuracy so that he would not waste lead or powder. He wanted as small a bore as possible to save in bullet weight and powder charge. To deal with hostile Indians he needed a rifle which could be loaded, fired, and reloaded rapidly. Gradually the German and Swiss gunsmiths evolved the rifle which the frontiersman needed, which became famous as the "Kentucky rifle."

The typical American target-shooting club developed competitions built around the standard hunting and military shooting positions—prone, sitting, and kneeling. American clubs sought accuracy at ranges far beyond those used by the "*Schützen*" riflemen. They experimented with barrel length, bore, powder charges, bullet shapes. They studied the effect of wind, temperature, and humidity on bullet flight.

At last, in 1871, a group of militia officers and retired Civil War officers in New York City organized the National Rifle Association and applied for a charter. The New York legislature set aside a plot of state-owned land at Creedmoor, Long Island, and a range was built of such size as to make it possible, for the first time in the U.S., to hold competitions which would attract large numbers of riflemen.

There were frequent international matches during the next 40 years and a general increase in the strength of the national rifle associations in the various nations. In 1881 the round bull's-eye with circular scoring areas was adopted. With only minor changes in the diameter of the bull's-eyes the targets adopted by the National Rifle



Courtesy National Rifle Assn., Wash., D. C.

METHOD OF SCORING IN TARGET SHOOTING

The shot on the left bull's-eye counts ten, the one on the right, nine

Association in 1881 are still used both for training and for competition.

Between 1895 and 1907 the rifle took on new military importance with the development of satisfactory smokeless powder, metal-jacketed bullets, bolt-action magazine rifles, and greatly increased bullet velocities. The elimination of smoke made possible the delivery of aimed fire in greater volume. Good shooting at ranges from 500 yds. to 1,000 yds. was no longer limited to marksmen using custom-built rifles.

The Spanish-American War and the Philippine Insurrection, coupled with the stimulating influence of congressional support, widened interest in organized target shooting.

In 1907 the State of Ohio opened a new range on the shore of Lake Erie, designed to meet all the requirements of the expanding national matches. This was Camp Perry, the range that was to be the Mecca of American riflemen for the next 40 years.

Target shooting with the .22-caliber rifle became a popular indoor sport about 1900. The range was usually 75 ft. or, in the case of school rifle clubs, 50 ft.

The pattern of target shooting in the U.S. seems to be now well established. It is divided into three principal categories: (1) high-powered rifles, (2) small-bore rifles, (3) pistols and revolvers. The high-powered rifle events are fired at ranges of 200, 300, 500, 600, 800, 900, and 1,000 yds. At 200 yds. the firing is generally from the standing position, slow fire, and from the sitting or kneeling position, rapid fire. At 300 yds., prone, rapid fire is generally specified. At 600 and 1,000 yds., prone, slow fire is the rule.

Small-bore target shooting is divided into the indoor or "gallery" phase and the outdoor phase. Indoors, the standard ranges are 50 ft. and 75 ft.; the latter range is almost extinct. Firing is from the prone, sitting, kneeling, and standing positions. Out of doors the standard ranges are 50 yds., 50 meters, 100 yds., and 200 yds. Outdoor ranges often are lighted for night shooting. Small-bore shooters who compete in official tournaments are classified on the basis of their scores into five

classes, i.e., "masters," "expert," "sharpshooters," "marksman, first class," and "marksman."

The pistol and revolver program follows the pattern of the .22-caliber rifle program. There are indoor events at 50 ft. or at 20 yds. The 20-yd. range (formerly standard for indoors) is rapidly becoming obsolete because of the greater ease of finding suitable 50-ft. range sites and also because the shorter distance makes it possible to use the same range for both pistol and .22 rifle events. Outdoor matches are fired at 25 and 50 yds. Outdoor ranges may be lighted for night shooting. Timed and rapid-fire events are held at 25 yds., out of doors and slow-fire events at 25 yds. and 50 yds.

Target shooting with rifles and pistols has the best safety record of any organized sport. Because of the method of organization, careful instruction, and excellent supervision, serious accidents of the type so often encountered in football, baseball, boxing, and other sports are almost unheard of on the target ranges. As a matter of fact, insurance statistics indicate that firearms accidents of all types, including those in the hunting field and in homes, account for a lower percentage of accident claims than do injuries received by picnickers.

Targum (*tār'gūm*), the name applied to one of several Chaldee versions of the Old Testament. These translations became necessary when the Hebrew language was superseded by the Chaldee, or Aramaic, tongue in the general vocabulary of Palestine. Although they are not of great value for the criticism of the text, these writings are helpful in that they furnish means to study the life and customs of the people at the time they were written. Among the Targums extant are those of the Prophets, Job, Ruth, Esther, Lamentations, Song of Songs, Ecclesiastes, Proverbs, and Psalms. There are in fact three Targums to Esther and three to the Pentateuch.

Tarifa (*tä-rē'fä*), a seaport city of Spain, in the province of Cadiz, on the Strait of Gibraltar. It is situated 25 m. s.e. of Cape Trafalgar, being the most southerly town on the European continent. It was founded in 710 A.D. by an Arab chief named Tarif ibn Malek. The Moors required all vessels passing through the Strait of Gibraltar to pay duties at Tarifa, and the duties were called *tarifas*, whence came the English word *tariffs*. A force of Spaniards from Castile captured Tarifa in 1292, and the French took possession of it in 1823. Population, ca. 15,000.

Tariff (*tār'if*), a list or schedule of duties to be paid to the government on the importation or exportation of articles of merchandise.

Tariff duties may be practically prohibitive of the imports or exports to which they apply or may be only mildly regulative of such trade. They may be applied primarily with a view to

obtaining government revenues or for other purposes; import duties are frequently referred to as *for revenue* or *protective* depending upon whether their major purpose is that of obtaining funds for the government or the protection of national industries from the competition of imports. Tariffs may be *specific* (for example, cents per pound, yard, or gallon) or *ad valorem* (a percentage of the value of the goods). The tariff rates may be fixed unilaterally by the government applying them or by agreement with other governments.

In the U.S. tariffs have been levied only on imports for revenue and for protection, but many articles are on the free list. Both export and import duties were charged in the colony of New Netherlands as early as 1629, and the Massachusetts Bay Colony levied import taxes in 1668. An unsuccessful effort was made by the Continental Congress to unite the colonies on a general tariff law.

President Washington signed the first tariff act passed by the U.S. on July 4, 1789. It was prepared by Alexander Hamilton and provided duties ranging from 5 to 15 per cent, though only 47 articles were specially enumerated. Unenumerated articles, except for a short free list, were dutiable at 5 per cent *ad valorem*. The purpose of this tariff was to provide revenue for the general government, both for its support and to discharge the national debt. It provided duties averaging 8 per cent *ad valorem*, but the duties were raised to an average of 11 per cent in 1790 and 13 per cent in 1792. Refined sugar and tobacco were placed on the enumerated list in 1794, and another extension of the list was made in 1797.

The War of 1812 had encouraged a shift of capital from commerce to manufacture, and had also depleted the national treasury. Mainly to increase revenue, a new tariff was adopted (1816) which, however, embodied several markedly protective features. The following year, President Monroe asked Congress for a clear policy of protection. Opposition to protection continued to be voiced by the so-called Strict Constructionists who maintained that the Constitution empowered Congress to impose taxes only for purposes of revenue. In 1824, a new tariff bill was passed, which yielded an average rate of 37 per cent and increased the duties on metals and agricultural products. This measure was championed by Henry Clay, who made himself the leader of the so-called *American system*, which aimed to combine a high protective tariff with Federal expenditures for internal improvement.

The confused economic interests at the bottom of the tariff controversy began to crystallize during this period. Southern planters, fearing that the British might stop buying American cotton in reprisal for the high duties on British manufactured cottons and wools, considered protection

as an unconstitutional invasion of states' rights.

The so-called *tariff of abominations*, imposing duties on raw materials, was passed in 1828, and yielded an average rate of 41 per cent on the imports which came in despite the tariff. Calhoun and South Carolina remonstrated against this measure, because some of the duties were prohibitive, and they were supported and aided in the protest by Alabama, Georgia, and North Carolina. It was claimed by the opponents of the measure that Congress had no right to levy tariff duties for protection, urging not only the injustice of a high tariff from which exporting states received no benefit, but also its general unconstitutionality. In 1832, the tariff law was remodeled, but it still retained the principle of protection, and South Carolina immediately proceeded to nullify the act. Jackson met nullification with marked decision, but Henry Clay introduced the Compromise Bill of 1833, which provided for a gradual reduction of tariffs to a uniform rate to be reached in 1842. The Polk-Walker tariff of 1842, so called from Robert J. Walker, Secretary of the Treasury under President Polk, further reduced rates but was still a protective measure. In 1846, a new tariff was enacted which was referred to as a *tariff for revenue only*, though it retained protective features. The tariff of 1857 made a further reduction of duties and remained in force until 1861.

The Morrill tariff went into effect on Apr. 1, 1861, and practically doubled existing duties. Immediately after this, the Civil War enlarged the necessary expenditures of the government, which were met by successive bills raising the tariff.

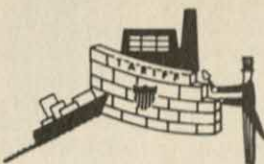
The McKinley tariff of 1890 introduced into American tariff policy the so-called principle of *reciprocity* (*q.v.*). It also enlarged the free list and provided a bounty of two cents per pound on sugar in lieu of duty. It increased the tariff on many commodities and some articles were practically barred from importation because of the duty. As a result of these changes, the Act of 1890 reduced considerably the revenues derived from the import duties. The tariff was a strong political issue in the Presidential campaign of 1892, contributing to the defeat of the Republican party. The Wilson tariff of 1894 reduced the duties about 38 per cent and enlarged the free list considerably without abandoning protection. It carried with it a tax of 2 per cent on the excess above \$4,000 per annum of all incomes, but the Supreme Court declared this feature unconstitutional. The Wilson tariff was dropped after the Republicans returned to office in 1896. Its successor, the Dingley tariff of 1897, reintroduced most of the high rates of 1890. While public sentiment did not demand the scrapping of protection, it began to appear that the desired goal of protection without stoppage of trade had not yet been achieved. In this respect the Payne-Aldrich tariff of 1909 promised

CHANGING TARIFF PHILOSOPHIES

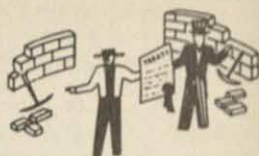
1791-1815 TARIFF FOR REVENUE



1816-1933 PROTECTIVE TARIFF



PRESENT RECIPROCAL TARIFF



GRAPHICS INSTITUTE FOR THE PHILADELPHIA INQUIRER

more than it performed, and by its very failure to find a solution raised the tariff issue to paramount political stature. Thus, with the Democratic victory of 1912, revision was inevitable, and the Underwood Act of 1913 followed party policy by effecting a general reduction in rates. The Republican campaign of 1920 included the promise of upward revision. Two years later the Fordney-McCumber Act amply fulfilled this pledge by imposing a schedule higher than any previously attempted in this country.

As a move in the direction of "taking the tariff out of politics," the U.S. Tariff Commission was established in 1916 to supply Congress with detailed information relating to imports, domestic production, and all questions connected with commercial policy and commercial treaties. The Tariff Act of 1922 included the so-called flexible tariff provision which authorized the commission to investigate the difference between costs of production at home and abroad, and authorized the President to adjust duties on competitive articles, raising or lowering them within certain limits to equalize the competition. This feature was continued in the Tariff Act of 1930 but has been little used since the passage of the Trade Agreement Act in 1934. The Tariff Commission continues to compile and analyze all information relating to competitive imports and relating to many aspects of trade policies, domestic and foreign. It supplies information to Congress and to the executive departments, information which was highly useful to the war agencies, and it plays an essential part in the negotiation of trade agreements.

The Hawley-Smoot tariff of 1930 lifted still higher the duties provided for by the Act of 1922. Following in the wake of the depression which began in 1929, the high tariff policy lost popularity in this country, partly because it evoked retaliatory measures by foreign governments. The resulting network of tariff walls did nothing to ease the stoppage of trade that played such a large part in the depression of the 1930's.

The Reciprocal Trade Agreement Program inaugurated by President Franklin D. Roosevelt in 1934 was designed to stimulate commerce by means of reciprocal reductions of duties and other restrictions on imports in agreements with foreign

governments. Combined with quota restrictions on the imports of a few selected commodities, this program has had the effect of reducing tariff barriers without destroying the protective features of American tariff policy.

A tabulation of the imports compared with the provisions of the trade agreements made through 1944 and still in effect, indicates that on the basis of quantities and values of imports as they were distributed in 1939, the trade agreement program has reduced the U.S. import duties on 63 per cent of the dutiable imports, and the average rate of duty on this part of the trade has been reduced from 55 to 32 per cent *ad valorem*.

The trade agreement law was enacted in 1934 for three years; it was extended in 1937, 1940, and 1943. It was again renewed for three years from June 12, 1945, with a change which authorized 50 per cent reductions not from the statutory rates of 1930 but from existing rates, some of which had already been reduced by one-half.

On the initiative of the U.S. Government, a collective agreement on tariffs and trade, known as the Geneva Agreement, was concluded in October 1947 by 23 countries under the auspices of the U.N. (see *International Trade Organization*). See also *Customs Duties; Customs Union; Preferential Tariff; Reciprocity*.

Tarkington (tär'king-tün), NEWTON BOOTH, popular and fluent American novelist and leader of the Indiana group of contemporary writers, born in Indianapolis, Ind., July 29, 1869; died May 19, 1946. He claimed that he began to talk at the age of seven months by calling his dog. As a boy he wanted to become a painter or illustrator. After being graduated from Princeton Univ. he was briefly interested in politics and served a year in the Indiana state legislature. Then he began to write stories and after five years he sold his first novel, "The Gentleman from Indiana" (1899). Its success settled him in his long career as a leading exponent of American middle-class society and the small town. He is perhaps best known for his amusing pictures of adolescent life in "Penrod" and "Seventeen." Some critics believe that Penrod and Willie Baxter in these novels are worthy successors of Tom Sawyer and Huck Finn.



Courtesy Underwood & Underwood, Washington, D. C.

BOOTH TARKINGTON

Among his other novels are: "The Turmoil," "The Magnificent Ambersons," "The Midlander," "The Plutocrat," and "Alice Adams." He was twice awarded the Pulitzer Prize, in 1918 for "The Magnificent Ambersons" and in 1921 for "Alice Adams." He also received the gold medal of the National Institute of Arts and Sciences. He was author of, or collaborator upon, almost 20 plays, among them: "Mister Antonio," "The Man from Home," and "Up from Nowhere." His last years, divided between his home in Indianapolis and Kennebunkport, Me., were spent in partial blindness. Although he had lived in New York, Rome, and on the Island of Capri, he never lost his devotion to Indiana. His pictures of American life are more photographic than interpretive, but his novels are never dull. His characters, exposed to the changes from poverty to wealth, to rivalry, business strife, love and sacrifice, never act stilted, but always represent average American people.

Tarleton (*tār'lē-tūn*), SIR BANASTRE, soldier, born in Liverpool, England, Aug. 21, 1754; died Jan. 25, 1833. He began the study of law, but entered the British army at the beginning of the American Revolution. In 1776, he operated with Clinton against Ft. Moultrie and the following year accompanied Cornwallis into New Jersey. Later he took part with Howe in the Battles of Brandywine and Germantown, and in 1779 was made lieutenant colonel of a force of cavalry and light infantry. With this force he operated in the South until the fall of Yorktown, in 1781, and returned to England the following year. As a cavalry leader he gained a reputation for cruelty, especially at Waxhaw Creek and at Camden, where he routed a part of the force under Gen. Gates. He was defeated by Gen. Morgan at Cowpens early in 1781. He served in the British Parliament for a term of years, was made a general in 1812. Tarleton

TARQUIN

was raised to the rank of baronet in 1815.

Tarn (*tārn*), a river of France, one of the chief tributaries of the Garonne. It rises in the Cévennes Mts., receives the Agout and the Aveyron, and has a length of 215 m. The valley is rich in the vine, coal, and cereals.

Tarnopol (*tār-nō'pōl*), Polish name of the Russian TERNOPOL, a city in the U.S.S.R., capital of Ternopol oblast in the Ukrainian S.S.R., 75 m. E. of Lvov. A railroad center, it manufactures machinery, chalk, and soap. Polish before World War II and occupied by the Germans until 1944, it was ceded to the U.S.S.R. in 1945. Population, ca. 35,000.

Tarot (*tār'ōt*), or TARROCHI, a playing card first used in Italy in the 14th century, having a grilled or checkered back. A pack had 78 cards, 22 of which were trumps. When the word is used in the plural it means a card game. See also *Cards*.

Tarpeian Rock (*tār-pē'yan rōk*), the name of a precipitous rock forming a portion of the Capitoline Hill in Rome, so named from Tarpeia, daughter of Spurius Tarpeius, governor of the Capitoline citadel. It is related that the Sabines bargained with the Roman maid to open the gate of the fortress to them, and as a reward promised her the golden ornaments worn on their arms. As they passed through the gates, they threw on her their shields, saying, "These are the ornaments we bear on our arms." She was crushed to death and buried on Tarpeian Hill. In ancient times, traitors were put to death by being hurled headlong from the hilltop.

Tarpon (*tār'pōn*), a large fish which is closely related to the herring. It is found in the West Indies and the waters off the southeastern coast of the U.S. The eyes are large, the mouth is placed obliquely, and the dorsal fin is high. It grows to a length of 4 to 6 ft. and has great power in leaping and swimming. Although the flesh is not valued highly, the tarpon is valuable for its silvery cycloid scales, which are used in ornamental work. This fish affords much sport in angling. Tarpon fishing is popular along the southern coast of Florida and Texas.

Tarquin (*tār'kwīn*), or TARQUINIUS LUCIUS, fifth legendary king of Rome, who is sometimes called *Priscus*, meaning *The Elder*. Tradition makes him the son of Lucumo, a Corinthian nobleman of Etruria, who subsequently settled in Rome in accordance with the advice of his wife, the prophetess Tanaquil. It is alleged that an eagle descended from a high eminence and snatched his cap while on the way to Rome, but afterward restored it. From this circumstance future honors were predicted for him in the Roman city, and his name was changed to Tarquin. King Ancus Martius made him the guardian of his children and gave him high position at

the court, and, after the death of the king, he was chosen his successor. He defeated the Latins and Sabines on several occasions, thus adding numerous towns to Roman territory. Tarquin is said to have made vast improvements at Rome, including the Temple of Jupiter. His reign of 38 years came to an end about 578 B.C., when he was assassinated by friends of the sons of Ancus Martius.

Tarquin, or **TARQUINIUS LUCIUS**, surnamed *Superbus*, son of Lucius Tarquin Priscus, legendary king of Rome. He was the son-in-law of Servius Tullius, whom he murdered in 534 B.C. to attain the Roman throne. His government was cruel and tyrannical, but his bold and warlike energy gained for Rome great advantages in military power and wealth. He abridged the privileges of the plebeians, banished and proscribed many of the senators, and controlled the nation without consulting the senate. Many of the plans laid by his father were carried out, and he likewise improved and strengthened the city. He conducted a siege of Ardea, a strongly fortified town of the Rutuli, in 510 B.C., but during his absence a rebellion was organized under the leadership of Lucius Junius Brutus, and he was exiled by the senate and the army revolted against him. He made three unsuccessful attempts to regain his power, in which he was joined by several neighboring cities, but was at last compelled to abandon the enterprise and flee to Cumae, where he died in 495 B.C.

Tarragon (*tār'ā-gōn*), plant used for seasoning because of its aroma.

Tarragona (*tār-rā-gō'nā*), a Spanish seaport, capital of Tarragona Province, situated at the mouth of the Francoli River on the Mediterranean Sea, 60 m. S.W. of Barcelona. The province covers 2,426 sq. m. and has a population of ca. 350,000. The city, known to the Romans as Tarraco, was captured from the Iberian Cessetanti in 218 B.C. and became one of the earliest Roman strongholds in Spain. In 711 A.D., the Moors drove out the Visigoths, but were in turn expelled by Raymond IV of Barcelona in 1089. In 1705, the city was burned by the British, and it was sacked by the French in 1811. There are noteworthy Roman remains, and the cathedral is a noble sample of early Spanish art. Wine is exported in huge quantities. Chocolate, soap, flour, ironware, paper, and salt fish are chief industries. Spinning, weaving, felt and lace making are also important. The shipping trade is extensive. Population, over 30,000.

Tarrytown (*tār'i-toun*), a village in Westchester County, New York, 25 m. N. of New York City. It is situated on the east side of Tappan Zee, or Lake, an expansion of the Hudson River, and is on the New York Central Ry. It is located on ground rising gradually

from the river, and it is a residential suburb. Tarrytown is the seat of the Hackley School (for boys), the Irving School for Boys, and Marymount Coll., a Catholic school for women. Nearby is the graveyard of the Dutch Church, in which Washington Irving is buried. The older buildings include the Dutch Church, erected in 1699, and the Philipse Castle, dating from 1683. "Sunbyside," the home of Washington Irving, is at Irvington, about 2 m. S. of the village. The village manufactures machinery and has an automobile assembly plant. Major André (*q.v.*) was captured at Tarrytown in 1780. It was settled in 1645 and incorporated in 1870. Population, 1950, 8,851.

Tarshish (*tār'shish*), the name of an ancient commercial city mentioned in the Old Testament. It is first spoken of in Genesis 10:4, though the place meant is actually Crete or Rhodes. Later references are believed to refer to settlements by the Phoenicians in Spain at the mouth of the Guadalquivir. The latter locality is supposed to be referred to from the fact that its products are identical with those connected with the region of Tarshish.

Tarsius (*tār'si-ūs*), a lemurlike mammal, the size of a squirrel, with large goggle eyes. It derives its name from the elongation of two bones of the ankle. Its fingers have adhesive disks which enable the animal to live in trees. Sleeping in the daytime, the tarsius is active at night and feeds on insects and birds' eggs. Its habitat is Malaya, Celebes, Java, Sumatra, and the Philippines.

Tarsus (*tār'sūs*), an ancient city in Asia Minor, in the Turkish province of Seyhan, 10 m. from the Mediterranean. It is located on the Cydnus River, in a fertile region, and has a considerable trade in cotton, wheat, barley, gallnuts, and various manufactures. Tarsus has a number of fine mosques; near it are ancient ruins of walls, theaters, and public buildings. The city was founded by Sardanapalus. It was captured by Alexander the Great, but afterward fell into the possession of the Romans, under whom it became a city of great importance. Cleopatra and Antony ascended the Cydnus as far as Tarsus. St. Paul and several Greek scholars were born at Tarsus. Population, ca. 28,000.

Tartan (*tār'tān*), woolen cloth woven in certain specific patterns of colored checks or squares, once used as a distinctive form of dress in the Scottish Highlands. The early Highlanders became skillful in maintaining the color pattern in the weaving process. As the Scottish clan system developed, each clan adopted its own tartan, which became such a symbol of national sentiment that the wearing of the tartan was prohibited, along with the kilt, from 1746 (after the uprising of the Jacobites, *q.v.*) until 1782. The tartan still serves as a form of heraldry

among Scots and persons of Scottish descent, some 500 patterns being officially registered.

Tartar (*tär'tēr*). See *Cream of Tartar*.

Tartaric Acid (*tär-tär'ik äs'id*), the acid found in grapes, pineapples, tamarinds, and other fruits. It is prepared commercially from *argol*, an impure potassium acid tartrate deposited from wine by converting it into a calcium salt, decomposing it with sulfuric acid, and allowing the solution to crystallize in a warm place. Tartaric acid is deposited in the casks in which wine is kept. This form of the acid may be purified by crystallization from boiling water and converted into cream of tartar. Tartaric acid crystallizes in large prismatic crystals and is soluble in about half its weight of water. By the action of heat it is converted into several other acids, whose composition depends on the temperature at which the tartaric acid was decomposed. It is very sour to the taste, but is inodorous, and has a marked action on several metals, such as iron and zinc. Tartaric acid is useful in making lemonade, in calico printing and dyeing, as a medicine, and for making baking and soda-water powders.

Tartars (*tär'tērs*), or **TATARS**, the name applied to a group of people inhabiting parts of Asiatic Russia, principally the steppes of Central Asia. It has reference chiefly to Moslems of Turkish origin. Tribes of Tartars, different from the Turks, comprised the Mongolians, who migrated from the northern part of China and Central Asia toward the west in the period extending from the 4th to the 10th century, and of whom descendants still occupy parts of southern Russia. In the 12th century large numbers of true Tartars joined Genghis Khan and marched under his leadership from Chinese Tartary to Europe. Chinese Tartary is a region in northern China, whence the true Tartars moved westward. The Tartaric language belongs to the Turanian tongues, of which the Turkish is the most typical, but there are many dialects.

Tartarus (*tär'tä-rūs*), in Greek mythology, a son of Aether and Gaea, the father of the giants of Echidna and Typhæus. In the "Iliad" the name Tartarus is applied to a region as far below Hades as Heaven is above the earth. This locality was regarded as the place of punishment for the spirits of the wicked. Later poets used the names Tartarus and the Elysian Fields for designating two divisions of Hades, the former being occupied by the criminals and the latter by the innocent dead.

Tartu (*tär'tōō*), or **YUREV**, before 1918 called **DORPAT**, a town of Estonia, on the Embach River, whose name is derived from Taara, a figure of Estonian mythology possibly related to the Scandinavian Thor. Founded (1030) by Yaroslav, a prince of Kiev, Tartu enjoyed great prosperity

under the reign of the Teutonic Knights, beginning in 1224. The Russians captured the town in 1558, lost it successively to the Poles and Swedes, and regained it finally in 1666. The modern town was built after a disastrous fire in 1777. The university, founded by Gustavus Adolphus of Sweden in 1632, possesses an important observatory, an art museum, a botanical garden, and a large library. The National Museum of Estonia, located here, contains fine ethnographic material. In 1918, Dorpat became part of the Estonian Republic. During World War II, the Germans occupied the city from 1931-44, when the Red Army drove out the invaders. Population, ca. 50,000.

Tartufe (*tär-tōōf'*), or **TARTUFFE**, subtitled "The Hypocrite," a comedy by Molière (*q.v.*) in five acts of rhymed verse, presented in its present form for the first time in 1667 by the Comédie Française. The leading character is Tartufe, an adventurer masquerading under the cloak of piety. He worms his way into the household of a well-to-do merchant, Orgon, who, with the connivance of his mother, goes so far as to make Tartufe a deed to his estate and to promise him that his already affianced daughter, Mariane, will marry him. Tartufe really wants Elmire, the merchant's second wife, and she arranges matters so that Orgon shall hear Tartufe's protestations of love to her. Tartufe meets Orgon's anger by claiming his property under the deed. All is resolved, however, when Louis XIV intervenes, saving Orgon's estate and imprisoning Tartufe. The name "Tartufe" has now come to mean a hypocritical pretender to religion.

Taschereau (*tä-sh'ērō*), **ELZÉAR ALEXANDRE**, cardinal, born at Ste.-Marie-de-la-Beauce, Québec, Feb. 17, 1820; died Apr. 12, 1898. He studied at the Quebec Seminary and in 1842 was ordained as a priest. He was connected with this institution for about 30 years, first as a professor and later as director. In 1860 he was made director of Laval Univ., and two years later he became vicar general of the diocese. He was made archbishop in 1870, and was appointed cardinal in 1886.

Tashkent (*täsh'kēnt*), a city of Asiatic Russia, in the Uzbek Soviet Socialist Republic, of which it is the capital. It is located on the Tchirchik River, a tributary of the Syr-Darya, about 400 m. s.e. of the Aral Sea, and is surrounded by a fertile region. A lofty wall of brick and stone, about 12 m. in circuit, surrounds the city, which may be entered by 12 gates. The chief buildings include a fortified castle, many mosques and temples, numerous bazaars, and the Central Asiatic State Univ. There are cotton mills, tobacco factories, sawmills, and leather, machinery, and cellulose industries. Fruit and vegetables are grown extensively in the oasis surrounding the town. Russians, Sarts, and Uzbeks predominate

in the mixed population. There is a good library and a museum containing a valuable collection of coins. Its trade is extensive, since it is easily accessible by caravans, and Russian enterprise is rapidly developing highways and railroads. Irrigation as an art dates from the 7th century A.D., when the town was founded. In 582, the Turks of Transoxiana made the capital of one of their two khanates near Tashkent, and the Chinese claimed the region from the Turks in 659. Russia annexed the city and surrounding territory in 1866. Population, 1939, 585,000.

Tasman (tä'smän), ABEL JANSZON, Dutch mariner, born in Lutjegast (in the province of Groningen, The Netherlands), about 1603; died in October 1659. On order of Antony van Diemen, governor general of the Dutch East Indies, he sailed from Batavia, by way of Mauritius, in 1642. He discovered Van Diemen's Land (Tasmania), and New Zealand, and also the Friendly and Fiji Islands, before sailing back to Batavia. On a second voyage (1644) he explored the coast of Carpentaria. He wrote about his voyages in a work called "Abel Janszon Tasman, Journal of His Discovery of Van Diemen's Land and New Zealand in 1642."

Tasmania (täz-mä'nī-ä), a state of the Commonwealth of Australia, which includes the island of Tasmania and a number of adjacent islands. The island of Tasmania is situated in the South Pacific, 140 m. s. of Australia, from which it is separated by Bass Strait. Its western shore is washed by the Southern Ocean. Its form is that of a triangle, measuring 180 m. from north to south and 190 m. from east to west. The area, including the adjacent islands and the island of Macquarie, is 26,215 sq. m. Macquarie is situated about 1,000 m. s.e. and for administrative purposes belongs to the state of Tasmania; it covers 89 sq. m.

DESCRIPTION. The coasts are quite abrupt and bold and are indented by numerous bays and harbors. Among the chief inlets are Oyster Bay in the east, Storm Bay in the southeast, and Macquarie Harbor in the west. The surface is diversified with chains of mountains which range from 3,000 to about 5,000 ft. above the sea. They reach the highest elevation in the northwest, in Cradle Mt., which has an altitude of 5,069 ft. An extensive plateau region is located in the west central portion, but it is more or less diversified by ridges and isolated peaks. Through the central part runs a valleylike depression, through which numerous spurs of mountains reach in various directions. This central plain extends through the island from the southeastern part, from the mouth of the Derwent River, almost due north, to the mouth of the Tamar River. Within the plain are a number of mountain lakes of considerable size, such as Great Lake and Sorell

Lake. The Derwent is the largest river, flowing almost due southeast into Storm Bay. It receives the inflow from numerous mountain streams and is the largest river of the island. The Huon is in the south, the Gordon and the Arthur in the west, the Tamar and the Forth in the north, and the Swan and the South Esk in the east.

The climate is more equable and temperate than that of Australia, being greatly influenced by the ocean, and it is warmer in the northern than in the southern part. The temperature ranges from 28° F. in winter to 100° in summer, and the mean temperature at Hobart is 46° during the colder and 63° during the warmer part of the year. Rainfall is greatest in the western part, where it ranges from 40 to 100 in., and in the eastern section it is from 30 to 40 in. The forests consist of Huon pine, beech, blue gum, acacia, eucalyptus, blackwood, and other native trees. Many species of birds common to semitropical countries abound, but the mammals common to the island are not numerous. The latter include the kangaroo, wombat, opossum, and wallaby.

INDUSTRIES. Agriculture and the raising of livestock are the main occupations. Wheat does not grow well but oats are grown rather extensively. All fruits common to the Temperate Zone thrive. Apples and raspberries are the two principal fruit crops. Cherries, grapes, plums, quinces, almonds, apricots, and peaches are also grown. Silk culture and the mulberry tree have been introduced successfully. Sheep are the principal domestic animals, but there are extensive interests in rearing horses, cattle, swine, and poultry. The cultivation of hops is a profitable enterprise.

Mining is carried on with considerable success; copper is the principal mineral. Material development has been made in the output of gold, and silver is also important. Other minerals include tin, coal, and iron. Large deposits of sandstone, limestone, and granite abound, and these minerals are quarried extensively for construction purposes. More tin is produced in Tasmania than in any other Australian state, and the mines are chiefly in Mt. Bischoff and the Brauxholme district.

Manufacturing enterprises are favored by extensive water power available in the streams and by the fact that Tasmania has an abundance of raw material. Large quantities of butter and cheese are made for export. Mutton and beef are preserved both by curing and freezing, and fruit and fish are canned. The paper pulp industry is increasing. Other manufactures include woolen goods, furniture, hardware, earthenware, shoes, and machinery. The leading exports are wool, wheat, sheep, dairy products, lumber, and minerals. A majority of the trade is with Great Britain and ports in Aus-

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tralia, chiefly in Victoria and New South Wales.

A railroad extends across the island from Devonport, on Bass Strait, to Hobart, at the mouth of the Derwent River. Another line crosses the northern part of the island from east to west, and these trunk lines have numerous branches to inland points. The lines total ca. 650 m., most of which are owned by the government. Considerable coastwise trade is carried in small vessels, and the highways near the larger towns are improved. Hobart, Launceston, and Strahan are the leading ports for foreign trade.

GOVERNMENT. The chief executive power is vested in the governor, who is appointed by the British crown. He is assisted by a cabinet of six ministers. Legislative power is vested in the parliament, which consists of a legislative council of 18 members elected for six years and a house of assembly of 30 members elected for five years. Voting for members of the legislative council is limited to those who have property, a university degree or veteran's status, but all citizens are eligible to vote for members of the lower house. The right to vote has been extended to both sexes. Common and secondary schools, and technical schools, are maintained, as well as several public and private colleges. School attendance is compulsory from the age of seven to 14 years, and children who reside a long distance from school are offered transportation by a state-owned railroad. The Univ. of Tasmania is located at Hobart, and there is an affiliated institution located at Launceston.

INHABITANTS. Formerly the island was inhabited by a native race similar to the races of Australia. They were short in stature, had broad faces, and the skin and hair were dark. These people declined rapidly after the island was colonized by Europeans. It is said that a woman named Tinganina, who died in 1876, was the last native Tasmanian. At present the inhabitants are chiefly British or of British descent. About two-thirds of the people belong to the Church of England and the remainder are Methodists, Roman Catholics, Presbyterians, Lutherans, Baptists, and Jews. Hobart, in the southern part, on the estuary of the Derwent River, is the capital and largest city, having over 70,000 inhabitants. Launceston, on the Tamar River, near the northern shore, has a large trade. Population, 1940, 240,525.

HISTORY. Abel J. Tasman (*q.v.*) discovered Tasmania in 1642, and it was named Van Diemen's Land in honor of the governor of the Dutch East Indies. Capt. Cook visited the island in 1777, and in 1803 a British expedition sailed from Sydney with the intention of claiming the island for England. They founded a settlement on the present site of Hobart, and in 1806 established the city of Launceston. Convicts were transported for some time from Sydney



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RUSSELL FALLS, TASMANIA

to Tasmania, but this was abolished in 1853. A considerable immigration began in 1817, and since then the island has made rapid advancement in population and the development of industries. It was declared independent of New South Wales in 1825. About 3,000 natives inhabited the island at the time of the discovery. Many laboring men and settlers left Tasmania on the discovery of gold in Australia in 1851, but most of them returned to make the island their permanent home. Tasmania became a member of the Commonwealth of Australia in 1901.

Tasmanian Devil (*tāz-mān'i-an dēv'l*), *Sarcophilus harrisii*, a marsupial or pouched mammal. It is now found only on Tasmania, dwelling in rocky, inaccessible places, though it was once found on the mainland of Australia. Its determined ferocity is suggestive of that of our native wolverine. Young devils are good tree-climbers, but adult specimens are not so adept.

Tasmanian Wolf (*tāz-mān'i-an wōlf*), an animal native to Tasmania, the largest representative of the carnivorous marsupials. It is about 4 ft. long and has a doglike muzzle and a tapering tail. The general color is grayish marked with yellow, and it has a series of stripes on the hind part of the back. In habit it is nocturnal, coming out at night to search for food. It was formerly abundant, but has been nearly exterminated, since it proved destructive to sheep and poultry.

Tassigny (*tās-ēn'yē*), JEAN DE LATTRE DE, army officer, born in Mouilleron-en-Pareds,

France, Feb. 2, 1889; died in Paris, Jan. 11, 1952. He was graduated from St. Cyr in 1913, and made the army his career. He was chief of staff for the Fifth Army when World War II broke out. After the armistice he worked to rebuild a French army, but was sent to Tunisia (1941) as commander of troops there. When he ordered his forces to resist the Germans, he was recalled to France. He was imprisoned when he organized his troops to fight the Germans after the landings on Normandy, but escaped to England. De Gaulle put him in charge of all French forces in North Africa, and he commanded the French First Army in the invasion of Southern France. He represented France at the German surrender on May 8, 1945, and was given command over the French zone of occupation in Germany. Later, he was inspector general of the regenerated French army and commander (1948-50) of ground forces of Western Europe under the provisions of the Brussels Treaty (*q.v.*) and French high commissioner in Indo-China from 1950 until his death.

Tasso (tās'ō), TORQUATO, epic poet, born in Sorrento, Italy, Mar. 11, 1544; died in Rome, Apr. 25, 1595. As his father was exiled shortly after his birth, Tasso spent his childhood with his mother in Naples, attending a Jesuit school. At the age of 10 he went to live with his father in Rome, in Bergamo, and at the court of the Duke of Urbino, to whose service his father was attached. At Urbino and at Venice, which they visited on several occasions, Tasso met many distinguished literary figures and began to compose sonnets and madrigals. He became a law student at the Univ. of Padua in 1559 but finding literature more to his taste, he transferred to a course in philosophy and letters. "Rinaldo," a long narrative poem on a chivalric theme, published in 1562, established his reputation, and he was invited to study at the Univ. of Bologna. On completion of his studies he lived for a time with Scipione Gonzaga, later Patriarch of Jerusalem, and then entered the service of Cardinal Luigi d'Este at the brilliant court of Duke Alfonso II of Ferrara. On a trip to Paris in 1570, he was granted an audience with Charles IX and made the acquaintance of Pierre de Ronsard (*q.v.*) and other poets of the French *Pléiade*. Tasso was a great favorite at Ferrara, enjoying the patronage of Alfonso II and the Princesses Lucrezia and Leonora d'Este. He published his sophisticated and charming pastoral drama, "Aminta," in 1573, and two years later completed his greatest work, the epic poem, "Jerusalem Delivered." In this period also, he wrote his "Discourses on the Art of Poetry."

Tasso was by this time weakened both physically and mentally by his scholarly studies and the exhausting life of the court. His "Jerusalem



TORQUATO TASSO

Delivered" had been submitted for examination to prominent churchmen and critics in Rome, and criticisms both real and imagined preyed on Tasso's mind. He became addicted to morbid fancies and fears that his work was heretical and that he would be denounced to the Inquisition. Following an attempt to stab a servant in 1577, he was confined in a Franciscan monastery in Ferrara. He escaped to his sister in Sorrento, but returned to Ferrara from time to time. Arriving at Urbino in 1579 to find everyone occupied with preparations for the duke's third marriage, he started a violent quarrel and was promptly consigned to the asylum of St. Anna. After a few months he obtained comfortable rooms where he entertained his friends and was even allowed to take trips with them. He wrote almost nothing in this period and was still very much worried about the "Jerusalem Delivered" which was being published without his permission (1581). He was released from St. Anna by Vincenzo Gonzaga, Prince of Mantua, in 1586, and spent the last years of his life traveling among the Italian cities, entertained royally wherever he went. In 1594, he was invited to Rome by Pope Clement VIII to receive the crown of laurels but died before the ceremony could take place. His last works, the tragedy, "Torris-mundo," the poems, "The Seven Days" and "Mount Oliveto" were in no way comparable to his great epic.

Taste (tāst), the particular sensation excited when a soluble substance comes into contact with certain parts of the mouth, particularly with the tongue. The tongue contains the chief end organs of the nerves of taste, including parts of the fifth and ninth pairs of nerves, but the sense of taste extends to the soft palate and the arches of the palate. These nerves end in the papillae, which receive the taste impressions and convey them to the nerves. The intensity of

the sensation depends upon the particular surface coming in contact with the thing tasted, increasing with the surface exposed to a soluble substance. A temperature of 72° F. is most favorable for producing the sensation. Temperatures much above or below this lessen the ability of the nerves of taste to receive impressions.

Salt and bitter substances have the greatest effect at the back of the tongue, this part being reached by the gustatory nerve, a branch of the fifth nerve distributed to the anterior two-thirds of the tongue. Sweet and sour substances affect most notably the edges of the tongue, where branches of the fifth pair of nerves permeate. Since these nerves are connected with the face, an acid distorts the countenance. Tastes may be classified as bitter, sweet, acid, and saline. The senses of taste and smell are intimately connected and much of the compound sensation produced by drinking or eating an aromatic substance, such as coffee, is due to smell rather than taste.

Tate (*tāt*), ALLEN, poet, critic, teacher; born Nov. 19, 1899, in Clarke County, Kentucky. He was graduated from Vanderbilt Univ. in 1922, and in the same year he founded *Fugitive*, a journal of poetry which he continued to edit for four years. In 1924, he married the novelist Caroline Gordon. Tate received a Guggenheim Fellowship in 1928. He began his teaching career at Southwestern Coll. in Tennessee (1934-36) and held a professorship at the Women's Coll. of the Univ. of North Carolina during 1938 and 1939. Later activities included his work on the CBS "Invitation to Learning" radio program (1940-41), a residence fellowship at Princeton (1939-42), and an honorary appointment, as poet, at the Library of Congress. Since 1944 he has taught English at the Univ. of the South, and has simultaneously edited the *Sewanee Review*. Tate has published a novel, "The Fathers" (1938), and a number of biographies, including "Stonewall Jackson—The Good Soldier" (1928) and "Jefferson Davis—His Rise and Fall" (1929), but he has been most productive as a poet and critic. Among his major poetical works are "Mr. Pope and Other Poems" (1928), "The Mediterranean and Other Poems" (1936), "The Winter Seas" (1944), and "Poems, 1922-1947" (1948). As a literary critic he is generally recognized as a major spokesman.

Tattersall's (*tāt'ēr-salz*), the name of a market in Grosvenor Place, London, famous as a place for selling riding and driving horses. It was established by Richard Tattersall, in 1780, and has remained the headquarters of the turf.

Tattoo (*tā-tōō'*), a mark in the skin produced by indelible pigments. The practice of tattooing prevails to a considerable extent in the brown and yellow races, especially among the North and South American Indians, South Sea Islanders,

Burmese, Bedouin Arabs, Dyaks, and Mongolians. It also survives (in part as a mark of virility or of occupation) to a certain extent among sailors and certain types of outdoor workers.

Tattoos are made by marking the skin with punctures or incisions and introducing into the wounds colored liquids, gunpowder, or other substances, so as to produce indelible figures or designs on the body. The custom is practiced differently in various regions, most peoples placing the tattoos only on the arms or other concealed portions of the body. The operation is quite painful. Instruments of steel, with small teeth, are commonly employed in tattooing. In many cases the figures are very elaborate and variously colored, often representing anchors, mermaids, animals, landscapes, and historical scenes. The practice is very old, dating from the early history of mankind.

Tauber (*tou'bēr*), RICHARD, singer, conductor, composer, born in Linz, Austria, May 16, 1892; died in London, Jan. 8, 1948. He was the son of the municipal opera manager at Chemnitz, Saxony. He studied conducting and composition in the conservatory at Frankfort on the Main, and later studied singing at Freiburg. His operatic debut was made in Mozart's "The Magic Flute." He was an immediate success, receiving in 1913 a five-year contract with the Dresden opera company. Thereafter he appeared in every important opera house in Europe and toured America, Australia, and Africa, becoming extremely popular. He appeared in films in English as well as German, the most popular of these being versions of his operetta successes, "Land of Smiles" and "Blossom Time." Tauber left Germany after Hitler's rise to power and in 1940 became a British subject.

Tauchnitz (*touk'nīts*), CARL CHRISTOPH TRAU-GOTT, printer and bookseller, born near Leipzig, Germany, Oct. 20, 1761; died there Jan. 14, 1836. He learned the printer's art when a mere youth and in 1796 founded an independent publishing establishment at Leipzig. He later enlarged it by adding a bookbindery and a type foundry. In 1809, he began the issuance of a series of elegant classical works, which attained a wide circulation in Europe. In 1828 he issued an extraordinarily accurate edition of Homer, this being accomplished by offering a ducat to every person pointing out an error. He introduced stereotyping into Germany in 1816 and was the first to apply that art in the publication of music.

Tauchnitz, CHRISTIAN BERNHARD, FREIHERR VON, publisher, nephew of the above, born in Leipzig, Aug. 25, 1816; died Aug. 14, 1895. He founded a printing business in Leipzig and published English translations of German authors. In 1842 he began the "Tauchnitz Edition of English Authors," a series that eventually included

over 5,000 volumes. The Duke of Saxe-Coburg-Gotha made him a baron in 1860.

Tauler (*tou'lä'r*), JOHANN, theologian and author, born in Strasbourg, Germany, in 1290; died there June 16, 1361. He became a Dominican monk in 1308 and studied theology in his native city and Paris. His religious opinions were influenced by Master Eckhart and he developed into a mystic, teaching that the worship of God is to be manifest in the heart and life. He preached in Basel, Cologne, and Strasbourg, and wrote many works in Latin and German. Among his chief writings are "Following the Lowly Life of Jesus" and "Sermons."

Taunton (*tan'tün*), one of the county seats of Bristol County, Massachusetts, on the Taunton River, 35 m. s. of Boston. The city is served by the New York, New Haven & Hartford R.R., and a number of bus lines. Among the noteworthy buildings are the public library, the county courthouse, the post office, the city hall, the Morton Hospital, and the State Hospital for the Insane. Taunton Green, Memorial Park, and Hopewell Playground are public recreation centers. Taunton is noted as an industrial center and enjoys a large jobbing trade. Manufactures include ironware, brick, locomotives, shoes, soap, cotton, and woolen textiles, hardware, furnaces, paper, agricultural implements, silverware, stoves, jewelry, leather, and plastics. Herring fishing is a productive enterprise. The first settlement was made in 1638, and the city was incorporated in 1865. Population, 1940, 37,395; in 1950, 40,109.

Taurus (*ta'rüs*). See *Zodiac*.

Taurus, a mountain range in Asiatic Turkey, forming the watershed between the Black and Mediterranean Seas and stretching from the upper Euphrates to the Aegean Sea. The slopes toward the Mediterranean are steep and leave a narrow coast plain, but toward the north it merges gradually into the high plain of Asia Minor. Two divisions are included in the Taurus proper, known as Ala Dagh in the east and Bulghar Dagh in the west. The Anti-Taurus range connects it with the Caucasus, Elburz, and Ararat. The highest peak of the Anti-Taurus is Arjish Dagh, height 13,112 ft., and of the Taurus proper, Bulghar Dagh, 11,415 ft. Between Syria and Asia Minor is the valley of the Cydnus, forming a pass known in ancient times as the Cilician Gates.

Taussig (*tou'sig*), FRANK WILLIAM, economist, born in St. Louis, Mo., Dec. 28, 1859; died, Nov. 11, 1940. A Harvard graduate, he began teaching there in 1882, later becoming full professor of political economy (1892-1935). Outstanding in his field, he was editor-in-chief of the *Quarterly Journal of Economics* (1897-1937). He wrote several volumes on economics, finance, and tariff questions. Chairman of the U.S. Tariff Commis-

sion (1917-19), he served as advisor on commercial treaties to the Paris Peace Conference (1919). He later became one of the first members of President F.D. Roosevelt's advisory group, the so-called "brain trust."

Tax (*täks*), an assessment levied upon persons, property, or business for the support of the government or other public service. No system of taxation has yet been devised that rests with equal fairness upon all individuals in the state, and possibly the consummation and application of such a system can scarcely be reached, even in the most democratic form of government. The four principles of taxation laid down by Adam Smith, which have been generally accepted by writers on political economy, may be briefly stated as follows: (1) each individual in a state should contribute to the support of the government in exact proportion to his relative ability; (2) the system of taxation should provide a certain and not arbitrary tax upon each individual; (3) each individual should be taxed to pay at the time and in the manner most convenient to himself; (4) and the general system of taxation should be so adjusted that the people are not compelled to pay more than is actually needed to support the state and supply adequate funds for the public treasury.

Taxes are divided into direct and indirect. *Direct taxation* is the term applied when the tax is paid directly to the municipality or state by the person upon whom it is levied, such as taxes upon real estate, domestic animals, machinery, or an income tax or poll tax. On the other hand, in the scheme of *indirect taxation* the tax is levied on one person but really paid by another. Indirect taxes are assessed on commodities and the amount of the tax is added to the price of the commodity, thus requiring the consumer to pay it. This is illustrated by the internal-revenue system, in which the stamp tax and excise taxes on tobacco and liquors are added to the commodities taxed. This may be illustrated also by the tariff system. For instance, a duty of 10 cents per pound on coffee, though nominally paid by the importer, is actually added to the price of the article and the consumer pays that much more per pound.

The ancient governments levied taxes upon unfriendly nations, and the booty of war obtained by sacking cities was a considerable source of income in supporting the army and building up home enterprises. In many instances private property of subjects was confiscated for use by the state, tribute was exacted for special privileges, such as trade or social advantages, and crimes were made punishable by the payment of heavy fines, payable either immediately or in installments. It was customary among the Jews to support the state by contributing the first and best fruits of their lands. The Roman Empire collected tolls,

PRINCIPAL SOURCES OF GOVERNMENT REVENUE

LOCAL



LICENSE FEES



PROPERTY TAX



TOLLS & CHARGES



GRANTS IN AID



STATE



GASOLINE TAX



MOTOR VEHICLE TAX



INHERITANCE TAX



INCOME TAX



LIQUOR TAX



SALES TAX



FEDERAL



INCOME TAX



INHERITANCE TAX



TOBACCO TAX



LIQUOR TAX



CUSTOMS RECEIPTS



Chart by Graphics Institute, N.Y.C.

exacted payments for conferring the privileges of citizenship on individuals, carried away the treasures of conquered nations, and levied tribute upon various articles of trade.

Taxation now partakes of various forms and includes taxes levied by the school district, township, municipality, county, state, and nation. The national taxes consist of levies on income, import duties, and excise taxes on such commodities as liquor and tobacco. Other taxes include assessments on real and personal properties, according to their estimated value. The assessment of railroad property is made in most instances by a state commissioner or an executive council. The value of property owned by individuals is ascertained by the assessor, whose estimates are subject to revision by a board of equalization, and the taxes are usually payable to the county treasurer, who later distributes the money to the different corporations and individuals entitled to receive the same. This form of direct taxation is with some exceptions the most equitable of any save that of the income tax.

In an *income tax* each individual pays according to total earnings, while a *property tax* requires each to pay in proportion to the amount of property owned, although one's revenues are not always proportioned to one's property. Besides, property is liable to double taxation in the case of mortgages, and in the form of money and valuable paper it is quite frequently withheld from enlistment by the assessor. *Poll taxes* are direct taxes, usually designed to restrict the franchise rather than to increase revenue. A *sales tax* is a levy upon gross sales of merchandise, personal service, chattels, and real property, including final and intermediary sales.

If the tax levied on property is not paid, the property is subject to sale for nonpayment. Tax sales are quite common and usually take place about the first of December, the property tax being due usually the first of January, thus giving the payer about 11 months' time to make payment before the sale. Public property, such as court-houses and school buildings, is exempt from taxation in most countries, as are houses of worship and education. See *Income Tax*; *Internal Revenue*; *Sales Tax*; *Single Tax*; *Tariff*.

Taxidermy (*tāk'sī-dēr-mŷ*), the art of preparing and preserving the skins of animals and of mounting them in a lifelike manner. The art is of considerable antiquity, but it reached a high state of development only about four centuries ago. Now vast collections of practically all kinds of animals may be seen mounted in national educational institutions, colleges, and municipal museums of nearly all civilized countries, and their careful preservation has been the means of stimulating research by naturalists and students. The process varies with the class of animals to be treated. It may be said that the general plan is to remove the skin, to which the feet, tail, hairs, and part of the head are left attached. All these parts are treated with an arsenic preparation, or with a powder containing arsenic, camphor, burnt alum, oak bark, and other substances, after which the skin is stuffed in such a manner that the form and size of the animal are carefully restored. The product is then perfumed with an aromatic substance, glass eyes are adjusted, and it is mounted to represent the living form. Reptiles, mammals, fishes, birds, and animals of all classes may be treated and preserved in this manner.

Taxonomy (*tăks-ŏn'ô-mŷ*), the study of laws and principles pertaining to the classification of organisms. The object of classification is to arrange all animals and plants in groups of various degrees of inclusiveness, expressing as closely as possible the actual degrees of relationship existing between them.

Tay (*tā*), the longest river of Scotland, which rises in the southern Grampians and, after a course of 120 m. toward the east, flows into the North Sea. It has an estuary 3 m. wide, but the tide flows a mile above Perth, to which city it is navigable for vessels drawing 10 ft. The principal tributaries include the Dochart, Lyon, Garry, Tummel, Arn, and Almond. The cities on its banks are Dunkeld, Aberfeldy, Perth, and Dundee, the latter being its chief port. The Tay valley is fertile. An area of 2,400 sq. m. is included in the basin. Valuable salmon and other fisheries occur in the Tay and its estuary.

Taylor (*tāl'ēr*), a city in Williamson County, Texas, 35 m. N.E. of Austin, on the Missouri Pacific and the Missouri-Kansas-Texas R.R.'s. Cotton, corn, pecans, watermelons and onions are produced in the vicinity. Taylor was settled in 1876, incorporated in 1890. Population, 1960, 9,434.

Taylor, ALBERT HOYT, naval officer and physicist, born in Chicago, Ill., Jan. 1, 1879; died in Claremont, Calif., Dec. 11, 1961. After his graduation from Northwestern Univ. (1902) and the Univ. of Göttingen (1909), he taught physics (1909-17) at the Univ. of North Dakota, where he was made head of the department. During World War I, he joined the Navy as a lieutenant and advanced (1922) to the rank of commander. He was superintendent (1923-45) of the radio division of the Naval Research Laboratory and then continued as a civilian researcher until 1948. Taylor was a pioneer in the development of radar (*q.v.*). In 1922, while working on naval radio communications, he noted how passing ships cause interference in reception. He realized the possibility of a useful application of a principle demonstrated in 1887 by Heinrich Rudolph Hertz (*q.v.*): that radio waves bounce off solid objects. British, French, and German physicists were also trying to utilize the same principle, and Taylor exchanged data with Sir Robert Alexander Watson-Watt (*q.v.*), with the result with Taylor and his associates were able (1932) to detect planes over a distance of 50 m. In 1938 they installed the first combat radar unit in the U.S.S. *New York*, and in 1939 they began the manufacture of this equipment. After World War II, Taylor was awarded the Medal of Merit. The holder of 54 patents, he retired in 1948; in 1959 he was awarded the Stuart Ballantine Medal of the Franklin Inst.

Taylor, ANDREW THOMAS, architect, born in

Edinburgh, Scotland, in October 1850; died Dec. 5, 1937. He studied in Edinburgh and London and later on the continent. In 1883, he emigrated to Canada and established himself as an architect in Montreal. For some years he was professor of architecture in the Presbyterian Coll. of Montreal and designed many buildings in that city. He published "Dominion Drawing Books" and "Towers and Steeples of Christopher Wren."

Taylor, BAYARD, traveler, translator, author, born in Kennett Square, Pa., Jan. 11, 1825; died in Berlin, Germany, Dec. 19, 1878. The son of a farmer, he began to write verse at the age of seven. At 17 he was apprenticed to a printer. His first book, a volume of verse called "Ximena," was published in 1844. At 19, he made his first trip to Europe, having contracted to report his travels to the *Saturday Evening Post*, the *United States Gazette*, and the *New York Tribune*. This trip was recorded in book form in "Views Afoot" (1846). Taylor later engaged in journalism in Pennsylvania and for the *Literary World*, in New York. After 1848, he managed the literary department of the *New York Tribune*. For this publication, he followed the gold rush to the Pacific coast, describing his impressions in "El Dorado" (1850).

After his wife's death, Taylor traveled in Africa and in the Far East (1851-52) and sailed with Perry to Japan in 1853. At home again, he published more travel books and made a lecture tour. His next European trip (1856-59) resulted in "Northern Travel" and other publications. During part of the Civil War, he was a correspondent for the *New York Tribune*. In 1862, he was secretary of legation at St. Petersburg. During his last years he received many honors, in Germany as well as in the U.S. He was appointed minister to Germany in 1878.

Taylor's literary efforts include three novels, as well as a dozen volumes of verse. He is best known today for his translation of Goethe's "Faust."

Taylor, (JOSEPH) DEEMS, composer, writer on music, born in New York City, Dec. 22, 1885. Taylor was educated at New York Univ. (A.B., 1906) and studied composition privately (1908-11). He thereafter carried on a dual career in music and journalism, achieving recognition for his compositions while working as a newspaper correspondent (1916-17) and magazine editor (1917-19). He was music critic for the *New York World* (1921-25) and *New York American* (1931-32) and editor of *Musical America* (1927-29). An early music commentator for the Columbia Broadcasting System, he handled many programs—including, most notably, the New York Philharmonic Symphony broadcasts (1936-43). Among his many books are "Of Men and Music" (1937), "The Well-Tempered Listener" (1940), "Some



Wide World Photos

DEEMS TAYLOR

Enchanted Evenings" (1953), and "The One Track Mind" (1953). Among his musical works are "The Siren Song" (1912), "Through the Looking Glass" (1922), "Restoration" (1950), "The Dragon" (1954), and the operas "The King's Henchman" (1927) and "Peter Ibbetson" (1931).

Taylor, FRANCIS HENRY, museum director, born in Philadelphia, Pa., April 23, 1903; died in Worcester, Mass., Nov. 22, 1957. Taylor was educated at the Univ. of Pennsylvania, the Univ. of Florence, the Univ. of Paris, and the Institut d'Estudis Catalans in Barcelona. He held various fellowships before becoming (1927) assistant curator of the Philadelphia Museum of Art. He became director of the Worcester (Mass.) Art Museum in 1931, returning there in 1955 after serving as director of the Metropolitan Museum of Art in New York City from 1940 to 1955. While heading the New York museum, he directed its diamond jubilee campaign, which raised \$7,500,000 for modernization and expansion of the institution. Besides monographs on medieval art and archaeology, Taylor wrote "Babel's Tower" (1945), on art education, and "The Taste of Angels" (1948), a history of art collecting.

Taylor, FREDERICK WINSLOW, engineer, inventor, born in Germantown, Pa., March 20, 1856; died in Philadelphia, March 21, 1915. Educated at Phillips Exeter Acad. and the Stevens Inst. of Technology, Taylor was a laborer, gang boss, foreman, and, ultimately, chief engineer for the Midvale Steel Co. in Philadelphia. In the course of years of experimentation, he formulated the principles of scientific management by which industrial operations could be effectively systematized. Taylor, the first to make the time and motion studies still used in analyzing production, began, about 1893, to work as a private consultant to such firms as the Bethlehem Steel Co. An inventor of machinery and manufacturing methods, he was particularly noted for a process

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for treating high-speed tool steels. He wrote, among other books and technical papers, "The Principles of Scientific Management" (1911). A prominent amateur tennis player, Taylor won the U.S. doubles championship in 1881 at Newport, R.I.

Taylor, HENRY OSBORNE, historian, born in New York City, Dec. 5, 1856; died there, April 13, 1941. He was educated at Harvard Univ. (B.A., 1878) and at the law school of Columbia Univ., but he soon devoted all of his time to his special subject, the history of civilization. A painstaking researcher, Taylor spent many years on each of his books. These include, besides his *magnum opus*, "The Medieval Mind" (2 vols., 1911), his "Ancient Ideals, a Study of Intellectual and Spiritual Growth from Early Times to the Establishment of Christianity" (2 vols., 1900), studies of other periods of history, "A Layman's View of History" (1935), and "A Historian's Creed" (1939).

Taylor, JEREMY, clergyman, born in Cambridge, England, Aug. 15, 1613; died in Lisburn, Ireland, Aug. 13, 1667. He was educated at Cambridge Univ. and took orders in 1633. Appointed to Oxford by Archbishop Laud in 1635, Taylor later served as chaplain to the archbishop and to King Charles I. Deprived (*ca.* 1645) of his living at Uppingham (to which he had been appointed in 1638), for his support of the royalists, Taylor served as principal of a school in Wales and as private chaplain to the 2nd earl of Carbery. The earl's home, "Golden Grove," lent its name to a devotional manual written by Taylor in 1655. He had already written "Episcopacy Asserted" (1642) and his most important work, "The Liberty of Prophesying" (1647). The last was a plea for toleration. These and his collections of sermons, devotional works, and learned theological works were written in a rich, imaginative style which was admired by his contemporaries and by later critics as well. At the Restoration, Taylor was named bishop of Down and Connor and of Dromore, becoming at the same time vice chancellor of the Univ. of Dublin and a member of the Irish privy council.

Taylor, MAXWELL DAVENPORT, army officer, born in Keytesville, Mo., Aug. 26, 1901. A graduate of the U.S. Military Acad. (1922), where he later taught languages (1927-32) and served as commandant (1945-49), Taylor was an airborne infantry officer during World War II. The first general to land in France, he was divisional commander of the 101st Airborne Division through D-Day and the Battle of the Bulge (Christmas 1944). Well acquainted with the Far East, where he had served in Tokyo (1935-39) and China (1939), Taylor commanded the Eighth Army in Korea (1953). Made full general (1953), he was commander of the U.S. Far Eastern Army forces (1954)



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ZACHARY TAYLOR

and U.S. and U.N. commander in the Far East (1955). He was chief of staff of the U.S. Army (1955-59), then retired from the service. In 1960 he published "Uncertain Trumpet," a critical study of the U.S. defense establishment. In 1961 President Kennedy made him his military aide, and in 1962 Taylor returned to service as chairman of the U.S. Joint Chiefs of Staff.

Taylor, MYRON CHARLES, lawyer, business executive, born in Lyons, N.Y., Jan. 18, 1874; died in New York City, May 6, 1959. After graduation (1894) from Cornell Univ., he practiced law. Joining the U.S. Steel Corp. in 1927, he became chairman of the board and chief executive officer in 1932. He resigned in 1938 and devoted himself to the problem of resettling political refugees. He also served (1933-35) on the Industrial Advisory Board of the National Recovery Admin. He went to the Vatican (1939) as President Franklin D. Roosevelt's personal representative (a U.S. ambassadorship to the Vatican was ended in 1867); he then served as President Truman's representative until 1950.

Taylor, RICHARD, army officer, born near Louisville, Ky., Jan. 27, 1826; died in New York City, April 12, 1879. He was the only son of Zachary Taylor (*q.v.*). He received his education in Europe and at Harvard and Yale. For a time he acted as manager of his father's Mississippi cotton plantation, but later established a sugar plantation in Louisiana. From 1856 until 1861 he was a member of the Louisiana state senate. At the outbreak of the Civil War, he was appointed a

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colonel in the Louisiana infantry, becoming a lieutenant general in 1864. On May 4, 1865, he was forced to surrender his forces to the Union Army. He wrote a volume of reminiscences, "Destruction and Reconstruction" (1879).

Taylor, ZACHARY, 12th President of the U.S., born at Montebello, Orange County, Virginia, Nov. 24, 1784; died in Washington, D.C., July 9, 1850. He was the third son of Richard Taylor, a colonel in the Revolutionary War, who, in 1785, moved to Kentucky. His education was limited to what tutors could give and to what a young lieutenant could learn of war under William Henry Harrison (*q.v.*). In 1810, Taylor married Margaret Mackall Smith and bought a plantation near Baton Rouge, La., but continued in army service, guarding the frontier and fighting Indians.

He defeated the Seminoles in 1837, was stationed in Texas during 1844 and 1845 and held the Rio Grande line when Mexican troops crossed the border. His victories at Palo Alto (May 8, 1846), and Resaca de la Palma a day later, won him fame, but President Polk criticized him for the terms of the Monterrey armistice. Taylor defended himself in the newspapers and Polk retorted by ordering Taylor to remain on the defense and turn a good part of his troops over to General Winfield Scott for an attack on Mexico City from the south. In spite of orders and a depleted force, Taylor took the offensive and defeated a larger Mexican force at Buena Vista (*q.v.*).

Whig leaders like Thurlow Weed (*q.v.*) of New York saw in Taylor an admirable candidate for President of the Harrison type and nominated him in 1848. A cautious campaign, silent on the issues, but emphatic on "Old Rough and Ready's" military achievements, won Taylor a narrow victory over Lewis Cass (*q.v.*). The struggle over slavery in the newly acquired territory immediately involved Taylor. That struggle had begun in 1846, when Rep. David Wilmot (*q.v.*) of Pennsylvania proposed that neither slavery nor involuntary servitude should exist in such territory. The campaign of 1848 had ignored the swell of debate over the Wilmot Proviso, although the election of 13 Free Soil Congressmen proved public interest in the issue. The discovery of gold in California made an ostrich policy impossible for either party; California was clamoring for civil government. Taylor urged that California and New Mexico organize themselves as states and ask admission to the Union. When California followed that counsel and presented a free state constitution, along with Minnesota, Southerners saw slavery limited in its expansion and their own political power diminishing. Southern extremists advocated secession as a remedy, strong Aboli-

tionists were not averse, but Henry Clay and Daniel Webster (*qq.v.*), put the Union first. The former devised the Compromise of 1850 (*q.v.*); the latter supported the program to admit California as a free state, organize the remaining territory acquired from Mexico without mention of slavery, abolish the slave trade in the District of Columbia, and enact a new Fugitive Slave Law. Taylor opposed the compromise measures.

In foreign affairs, Taylor was apt to substitute a military man's boldness for the processes of diplomacy. This tendency, however, had no evil consequences, for the principal diplomatic achievement of his administration was the Clayton-Bulwer Treaty (*q.v.*) of 1850, which provided for a neutralized and unfortified Isthmian canal under joint Anglo-American auspices. Taylor died in office, leaving the growing crisis over the extension of slavery to his successor, Vice President Millard Fillmore (*q.v.*).

Taylorville (*tā'lē-rvīl*), county seat of Christian County, Illinois, 25 m. s.e. of Springfield. It is on the Wabash, the Chicago and Illinois Midland, and the Baltimore & Ohio R.R.'s. The city owns and operates an airport. Coal mines are worked near the city. Its industries include the manufacture of greeting cards, paper, and tools, and soybean products. It was founded and incorporated as a town in 1839. Population, 1950, 9,188.

Tchad (*chād*). See *Tsad*.

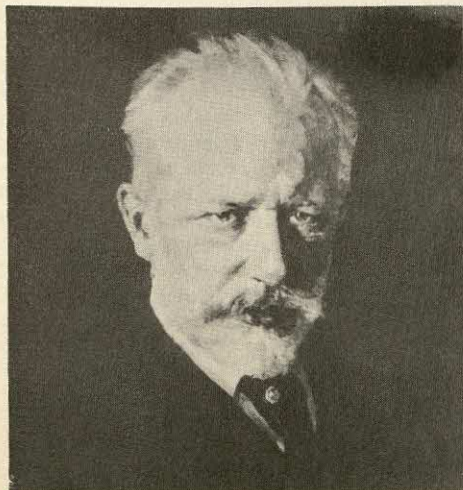
Tchaikovsky (*tchī-kōf'skŷ*), PETER ILYITCH, composer, born in Kamsko-Vitkinsk, Russia, May 7, 1840; died in St. Petersburg (now Leningrad), Nov. 6, 1893. Educated for the law, Tchaikovsky surprised everyone when he gave up his position as a minor official in the Ministry of Justice to

embark upon a musical career (1862). Under the influence of Nikolai Rubinstein—one of his teachers and brother of the famous Anton—he entered the conservatory at St. Petersburg, and remained there until 1866 when he became head of the newly established Moscow Conservatory. He retained this chair for 12 years, although his major interest was always in the creative rather than the educational aspects. His earlier works failed to arouse critical or popular enthusiasm, but they did gain for him a small coterie of devoted admirers. Among these was Mme. Nadedja von Meck, who sponsored the composer's work from 1876 until 1890, although in all those years she met him only once and that by accident. By the time Mme. von Meck withdrew her support, in 1890, Tchaikovsky no longer needed financial aid. He had gained sufficient recognition to be granted an annual income by the Czar (1888), and his compositions were at last winning international attention. In 1888 he toured Europe as a conductor, and in 1891 he attended the dedication of Carnegie Hall in New York.

Oversensitive and highly nervous, given to periods of acute melancholia, Tchaikovsky created a great body of music, varied in form and theme but always marked by deep emotion and richly colorful expression. Drawing upon other cultures as well as Russia for musical forms and atmosphere, he gave them back to the world enriched both with the passionate mysticism of the Slav and with his own highly individual creative genius. This is shown to a high degree in his magnificent symphonic poems, where he ignores merely formal development and musical experimentation to concentrate upon the "poetic idea" which had inspired the work. Author of many lesser works such as piano pieces, and songs, he also wrote chamber music, and composed 11 operas, six symphonies, and three ballets. The operas are so definitely national in text and treatment that they are not often presented outside of Russia, although one of them—"Eugen Onegin"—is often given in concert form in other countries, and the opera called "*Pique Dame*" has been produced at the Metropolitan Opera House in New York. The "*Nutcracker Suite*" (1892) is one of his most popular orchestral compositions, while the overtures to "*Romeo and Juliet*" and "*Hamlet*," the "*Marche Slav*," and the stirring "*Overture 1812*," are universal favorites. "*Swan Lake*" and "*Sleeping Beauty*" are best known of his ballets. He reached his greater heights, however, in the symphonies which are his supreme achievement. Among these the "*Fourth*," "*Fifth*," and "*Sixth*" are generally considered his masterpieces. The famous "*Sixth*," otherwise known as the "*Pathétique*," received its première in St. Petersburg only a few days before his death. Since that historic event,

PETER ILYITCH TCHAIKOVSKY

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in 1893, Tchaikovsky's fame has grown steadily with the passing years until few now deny him his rightful place among the masters of musical composition.

Tchechov (*ch'ē'kōf*). See *Chekhov*.

Tea (*tē*), a genus of shrubs or trees allied to the camellia, having shiny, lanceolate leaves from 2 to 6 in. long and producing large white flowers of fine fragrance. The principal species is the *tea shrub* or *Thea sinensis* which is cultivated for its leaves, the important product which yields the tea of commerce. The tea plant is a hardy evergreen. While it has been grown successfully in numerous countries (including the Southern U.S., Brazil, and portions of British East and South Africa), it grows best in the tropical and subtropical climates of India, Ceylon, and the Far East, the areas from which the overwhelming proportion of commercial tea is obtained.

In its natural state, tea grows to a height of 15 to 40 ft. but when cultivated it is kept pruned to a bush of 3 to 4 ft. in height and diameter, a convenient size for plucking the leaves. It is grown at any altitude from sea level to 7,000 ft. Generally speaking, tea from the higher altitudes is superior to lower-grown tea, but both kinds require ample moisture. Under modern methods of cultivation, young plants are first developed from seed in a nursery and later replanted. As the bushes develop, they are carefully pruned to give them shape and high yield. In some locations bushes begin to yield in two to three years, but a pay-crop does not generally occur until the fifth year. The bushes yield thereafter for many years; under skilled cultivation some will continue to bear high-quality leaves after 100 years. The leaves are picked by hand, an enterprise frequently engaged in by whole families, but mostly by women, who develop amazing speed and dexterity in selecting and plucking the leaves.

There are three major types of tea: black, green, and oolong. All come from the same kind of bush and are grown and picked in much the same way. It is the manufacturing process which determines the type of tea which is produced. In producing black tea, the plucked leaves are brought to a factory where they are spread evenly and thinly on racks and exposed to drying air. After withering for 18 to 24 hours, the leaves are rolled by a machine to break the leaf cells and distribute the juices over the exterior of the leaves where they dry and remain until released by boiling water when the tea is brewed. Rolling also reduces the exposed surface of the leaves and gives them their familiar tight-rolled appearance. From the roller the tea goes to a fermenting room where it is spread thinly on a concrete or tile floor and exposed to cool humid air for a period seldom exceeding an hour, during which the leaves change to a bright copper color. After

fermenting, the tea is passed through chambers into which hot dry air is forced from a furnace. The dried leaves are then carefully sifted and sorted into two general classifications: broken grades made up of smaller and cut leaves, and leaf grades composed of larger, unbroken leaves. Each of these classifications is subdivided, the broken grades into broken orange pekoe, broken pekoe, broken pekoe souchong, fannings, and dust; the customary leaf grades are orange pekoe, pekoe, and pekoe souchong. These terms apply to leaf size and appearance rather than the quality of the tea.

Green tea is not withered or permitted to ferment before it is heat-treated. The fresh-plucked leaves are placed in a "steamer" and heated to a temperature of about 160° F., which prevents fermentation and makes the leaves soft and pliable. The tea is then alternately rolled and dried. The various grades of green teas are usually known as hysons Nos. 1 and 2, gunpowder, imperial, twankey, fannings, and dust. Oolong is a semi-fermented tea, a compromise between black and green. After picking, the tea is slightly withered in the sun and is worked by hand to break the leaf cells and permit a certain degree of fermentation. The tea is then alternately rolled and fired, after which it is taken to a central factory where it is re-fired, graded, and packed for shipment.

Black teas are produced largely in India, Ceylon, Java, and Sumatra; green teas primarily in China and Japan; and oolongs in Formosa. Before World War II, during which production in all of these countries except India and Ceylon was greatly disrupted, the total world production of tea amounted to nearly 2,000,000,000 lbs. annually, from an estimated 4,000,000 acres under cultivation. Of this amount, approximately one-half was exported, the other half being retained for consumption in the producing countries, principally China. The U.S. is second to the United Kingdom in consumption among the importing nations and fourth among all the nations of the world, being surpassed by China, the United Kingdom, and India. The total consumption of tea is equal to approximately 200 cups annually for every person in the world.

According to Chinese legend, Emperor Shen Nung discovered the virtues of tea in 2737 B.C., but the earliest recorded reference to it is in a letter of 317 A.D. written by a Chinese military leader. The use of tea gradually worked its way westward during the Middle Ages but it did not make its appearance in Europe until the 17th century, the first consignment being delivered by Dutch merchants about 1610. Thereafter, tea drinking spread rapidly in continental Europe, and from Europe to the American colonies. For many centuries, tea was grown only in China.



INDIAN TEA PLANTATION

It was introduced into Japan, about the 9th century, by Buddhist priests but it was not until the 19th century that it was cultivated in other countries. Tea was first grown in India and the Netherlands East Indies in the first half of the last century and in Ceylon after 1869, where it quickly replaced coffee after a virulent blight had destroyed most of the coffee plantations.

Teachers College (*tēch'ērz kōl'ēj*), a degree-granting institution whose name of "teachers college" or "college of education" indicates that its primary function is preparing teachers. It may be a part of a university or a separate institution. About one-third of all public-school teachers in the U.S. are prepared in designated teachers colleges. The usual curriculum includes: (1) teaching purposes and methods and teaching experience under supervision; (2) basic and broadening subjects; and (3) subjects which the student will teach.

Most separate teachers colleges were created as normal schools offering nondegree programs; several now prepare only elementary-school teachers. Many now also provide programs for non-teachers. Sixty-five present state colleges and universities formerly were teachers colleges. Universities formerly prepared no elementary-school teachers; some do not now.

All teachers colleges offer bachelor's degrees. Many separate, and all university, teachers colleges offer master's degrees (one year beyond the bachelor's). One separate, and many university, teachers colleges offer the doctor's degree (three years beyond the bachelor's). Programs for elementary-school teachers range in length from one

to five years; for secondary-school teachers from four to five years; and for college teachers from five to seven years.

Teak (*tēk*), a small genus of tropical trees of southeastern Asiatic regions, botanically *Tectona*, of the vervain family. The genus is known chiefly for one species, *Tectona grandis*, from which teakwood is obtained. Trees of this species grow up to 150 ft. in height. The leaves are large, undivided, and arranged in groups of two or three. The small, white flowers, borne in large branching clusters, are followed by cherrylike fruits, about 1 in. in diameter. Because of its strength and durability, teakwood is especially valuable for shipbuilding. It is also used in furniture, in which it appears as a very dark wood.

Teal (*tēl*), the common name given to various small ducks belonging, for the most part, to the genus *Anas*. Originally the name of a single species, the European or common teal, the term has been adopted for numerous species, all more or less closely related. These ducks are of worldwide distribution. Four species are of regular occurrence in North America, three in the U.S. The European teal nests in the Aleutian Islands. The green-winged teal, blue-winged teal, and cinnamon teal nest in Canada and the U.S.—the last-named only in the Far West. They are migratory but leave only the northern parts of their respective breeding ranges. Two Asiatic species, the falcated teal and the Baikal teal, are rare casual visitors to the Alaskan region. Teals are agile, fast-flying ducks, able to get into the air rapidly from either land or water. Their nests are usually built of grasses, sometimes concealed

in tufts of grass, and are placed on dry ground in proximity to a shallow pond or rivulet. The cream-colored eggs vary in number (partly according to species) from 6 to 18.

Teapot Dome (*tě'pôt dôm*), a great oil field in Natrona County, Wyoming, set aside by the Federal government as a naval oil reserve. In June 1921, the reserved land was transferred to the Department of the Interior. The so-called Teapot Dome scandal resulted from the lease of the field to the Sinclair oil interests by Albert B. Fall, Secretary of the Interior in President Harding's cabinet in 1922; he also leased the Elk Hills Reserve in California to E.C. Doheny, another oil man. Fall shortly thereafter resigned his secretaryship. Testifying before the Public Lands Committee of the U.S. Senate, Doheny declared (1924) that he had lent Fall \$100,000 without security or interest. In November 1926, both Fall and Doheny were acquitted of conspiracy in connection with the Teapot Dome lease, and Sinclair was acquitted in April 1928. Fall, however, was found guilty in October 1929, of accepting a \$100,000 bribe from Doheny for the lease of the Elk Hills Naval Oil Reserve in California. On June 1, 1931, the U.S. Supreme Court upheld the conviction, and Fall served a term in prison.

Tebet (*tâ-vâth'*), Hebrew name for the fourth month of the Jewish calendar, having 29 days. It corresponds to the time of early December to early January in the Gregorian calendar. The 10th day is observed as a fast day commemorating the beginning of the siege of Jerusalem by Nebuchadnezzar (*q.v.*).

Technical Education (*těk'ni-kal ěd-û-kă'-shûn*). See *Vocational and Technical Education*.

Technocracy (*těk-nôk'ra-sý*), a 20th-century program of social reform which grew out of the writings of Willard Gibbs. Stated in general terms, technocracy proposed that the economy be placed in the hands of the individuals essential in the production of goods. The development of the movement occurred principally after World War I with the founding of the Technical Alliance of North America in 1920. Howard Scott, Carl L. Alsberg, Stuart Chase, Thorstein Veblen, Charles P. Steinmetz, and Leland Olds were among the leading figures of the movement. Interest in technocracy grew during the depression that followed the 1929 crash. In 1933, Technocracy was incorporated as a nonprofit, nonsectarian, nonpolitical organization operating in the countries of North America.

According to technocratic theory, our technological advances in the production of commodities have so far outstripped the development of our social institutions, especially during the 20th century, that the control and management of our economic system must be completely reorganized. The technocrats argue that the present price

system is an anachronism and renders impossible the most efficient distribution and utilization of the products of industry. Technocracy proposes further that the present monetary system of value should be replaced by the physical factors of energy output and utilization, and that the methods of science be applied to social and industrial affairs. In order to accomplish these ends the technocrats postulate an economy governed by the scientists, engineers, architects, educators, physicians, sanitation experts, foresters, managers, accountants, statisticians, etc., who, it is maintained, have been principally responsible for the development of our advanced technological state.

Technology (*těk-nôl'ô-jý*), the study of the industrial arts. The rise of the modern economic system was made possible by the technological changes which took place in Europe and the U.S. in the 18th and 19th centuries. The invention of machinery greatly increased the volume of production and provided a tremendous impetus to the growth of the capitalistic economy. It resulted in an enormous rise in the standard of living, which, in turn, led to a great increase in the population.

However, not all of the results of the technological process were beneficial. An important by-product of the introduction of machinery was a reduction in the proportion of skilled to unskilled workers. A skilled artisan gradually found his task reduced to the performance of a few simple operations. The great mass of factory workers became mere tenders of machines and could easily be trained and replaced without difficulty. As a result, the bargaining power of the employee was weakened and his economic position became insecure.

The development of the modern mass-production industries changed the character of the industrial population. Between the two extremes of owner and production worker appeared managers, salesmen, government workers, and a huge group employed in the transportation and distribution industries. The banker and broker became key figures in the new economy. The scientist and engineer grew in importance, for the new machinery and complex processes required a high degree of theoretical knowledge. Inevitably, labor organizations appeared in answer to the dilemma of job insecurity.

Although it is impossible to interpret history solely in terms of technological change, it must be recognized that the revolutionary changes in production methods did much to condition many of the social and historical developments of the 19th and 20th centuries. With technological advancement came wealth and power, and the nations in which the new technology made the greatest strides became the political leaders of

the world. Thus the U.S. and the countries of Europe grew in strength and in influence.

Tectonics (*tĕk-tŏn'iks*), the study of movements and deformations of the earth's crust. See also *Earth; Geology*.

Tecumseh (*tĕ-kŭm'se*) or TECUMTHA, chief of the Shawnee Indians, born near Springfield, Ohio, about 1768; died Oct. 5, 1813. He was a brother of Tenskwatawa or Elskwatawa, known as "the Prophet," who had wide influence. In 1791 Tecumseh led the Shawnees on the warpath against the Kentucky militia. In 1805 he joined his brother in an attempt to form a confederacy of the western Indians against the whites. His confederated band collected on the Upper Wabash River, while he was organizing the southern tribes near the Gulf of Mexico. On Nov. 7, 1811, Gen. William H. Harrison (*q.v.*) routed Tenskwatawa's Indians at Tippecanoe, but with heavy losses. In the War of 1812 Tecumseh aided the British with his braves and was made a brigadier general. At the unsuccessful siege of Ft. Meigs (April 28-May 9, 1813) he greatly helped Gen. Henry A. Proctor, who commanded the British and Indian forces; when Col. William Dudley led his American troops into an ambush, they were massacred by the Indians. Later, Tecumseh took part in the battle of Lake Erie. He was killed while leading the right wing of the British forces at the battle of the Thames.

Tedder (*tĕd'ēr*), ARTHUR WILLIAM, first baron of Glenguin, air force officer, born in Glenguin, Scotland, in 1890. He was educated at Cambridge Univ. Commissioned an army officer in 1914, he served during World War I, and afterward held a number of air force commands before becoming director of training in the air ministry in 1934. In 1938 he became director general of research and development in the air ministry. In World War II he was responsible (1941-43) for air activities against the German army under Gen. Rommel, in Africa. In 1943 Tedder was chosen deputy supreme commander of the Allied invasion forces, second in command to Gen. Eisenhower, and held this post until the conclusion of the European phase of the war. During the last six months of the war he also directed Allied air operations in Europe. He was appointed marshal of the R.A.F. in 1945, and from 1946 to 1950 was chief of the air staff and first and senior member of the air council. In 1950 he was made chairman of the British Joint Services Mission in Washington, D.C., and the British representative on the standing group of the Military Committee of the North Atlantic Treaty Organization.

Te Deum (*tĕ dĕ'um*), the first two words of the hymn beginning with the words, *Te Deum laudamus*, of which the English version is, "We praise Thee, O God." The Latin hymn of this title is sometimes, with little ground, ascribed

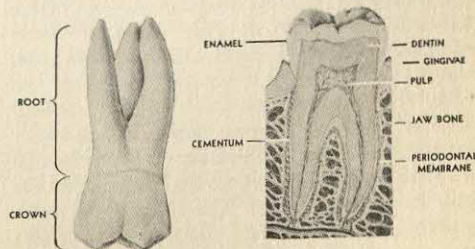
to St. Ambrose; some authorities assign it to Hilary of Poitiers. It is used extensively on occasions of triumph and thanksgiving and has engaged the genius of many musical composers. In the Anglican Prayer Book it forms part of the morning prayer. It is recited in the Roman Catholic Church on all Sundays, except those from Septuagesima to Palm Sunday inclusively and the Sundays of Advent.

Teeth (*tĕth*), hard, bony structures situated in the mouth or near the entrance to the pharynx of vertebrates, which are partially exposed when developed and used for seizing and chewing food. They are hard and dense and in most mammals, when developed, consist chiefly of dentine or ivory, invested on its upper surface and crown with enamel and at its base with cement. The roots of the teeth, embedded in the gum, have a small opening leading into the pulp cavity, through which numerous blood vessels and nerves penetrate. The teeth of most mammals are classified as incisors, canines, and grinders, although they vary considerably in structure and size; such variations depend largely upon the food and habits that characterize the animals. In the lion and other carnivorous mammals teeth are adapted to the eating of flesh; in the ox and herbivorous animals they are designed more particularly for cutting off and grinding grasses. On the other hand, in some animals they are specially fitted to cut trees, to serve as weapons of defense or means of anchorage, or to aid in constructing habitations.

Many species of fishes have compound teeth, which, whether simple or compound, are shed and renewed at different stages of their lives. Birds have no teeth, but in some species, the name is applied to a notch in the bill which is large and conspicuous among the birds of prey. Toads, turtles, ant-eaters, and tortoises have no teeth, but instead have a mouth so constructed as to facilitate compressing and swallowing the food. Serpents have a form of teeth on the palate, aside from those on the jaw, but the poison fangs of venomous species are the most conspicuous. Some edentates, for example the ant-eaters

MOLAR TOOTH AND SURROUNDING TISSUES

Courtesy American Dental Assn., Chicago, Ill.



| | Tooth | Hard tissue formation Begins | Amount of Enamel Formed at Birth | Enamel Completed | Eruption | Root Completed |
|---------------------|-----------------|------------------------------|----------------------------------|------------------|-------------|----------------|
| Deciduous dentition | Central incisor | 4 months <i>in utero</i> | Five sixths | 1½ months | 7½ months | 1½ years |
| | Lateral incisor | 4½ months <i>in utero</i> | Two thirds | 2½ months | 9 months | 2 years |
| | Cuspid | 5 months <i>in utero</i> | One third | 9 months | 18 months | 3¼ years |
| | First molar | 5 months <i>in utero</i> | Cusps united | 6 months | 14 months | 2½ years |
| | Second molar | 6 months <i>in utero</i> | Cusp tips still isolated | 11 months | 24 months | 3 years |
| | Central incisor | 4½ months <i>in utero</i> | Three fifths | 2½ months | 6 months | 1½ years |
| | Lateral incisor | 4½ months <i>in utero</i> | Three fifths | 3 months | 7 months | 1½ years |
| | Cuspid | 5 months <i>in utero</i> | One third | 9 months | 16 months | 3 years |
| | First molar | 5 months <i>in utero</i> | Cusps united | 5½ months | 12 months | 2¼ years |
| | Second molar | 6 months <i>in utero</i> | Cusp tips still isolated | 10 months | 20 months | 3 years |
| Permanent dentition | Central incisor | 3-4 months | — | 4-5 years | 7-8 years | 10 years |
| | Lateral incisor | 10-12 months | — | 4-5 years | 8-9 years | 11 years |
| | Cuspid | 4-5 months | — | 6-7 years | 11-12 years | 13-15 years |
| | First bicuspid | 1½-1¾ years | — | 5-6 years | 10-11 years | 12-13 years |
| | Second bicuspid | 2-2¼ years | — | 6-7 years | 10-12 years | 12-14 years |
| | First molar | at birth | Sometimes a trace | 2½-3 years | 6-7 years | 9-10 years |
| | Second molar | 2½-3 years | — | 7-8 years | 12-13 years | 14-16 years |
| | Third molar | 7-9 years | — | 12-16 years | 17-21 years | 18-25 years |
| | Central incisor | 3-4 months | — | 4-5 years | 5-7 years | 9 years |
| | Lateral incisor | 3-4 months | — | 4-5 years | 7-8 years | 10 years |
| | Cuspid | 4-5 months | — | 6-7 years | 9-10 years | 12-14 years |
| | First bicuspid | 1¾-2 years | — | 5-6 years | 10-12 years | 12-13 years |
| | Second bicuspid | 2¼-2½ years | — | 6-7 years | 11-12 years | 13-14 years |
| | First molar | at birth | Sometimes a trace | 2½-3 years | 6-7 years | 9-10 years |
| | Second molar | 2½-3 years | — | 7-8 years | 11-13 years | 14-15 years |
| | Third molar | 8-10 years | — | 12-16 years | 17-21 years | 18-25 years |

CHRONOLOGY OF HUMAN DENTITION

© Michigan Dept. of Health

Chart prepared by Logan and Kronfeld (modified by McCall and Schour)

and pagolins, have no teeth, though they belong to the mammals. The two tusks of the elephant are modifications of the incisors in the upper jaw, but in addition to these it has one or two molars on each side of the two jaws. Naturalists have studied the teeth of extinct and living animals with such minuteness that they are able to determine the genus with much accuracy by examining the tooth structure and form. Teeth do not constitute a part of the skeleton, but, like the hairs, belong to the skin or exoskeletal part of the body.

HUMAN TEETH. Man and most mammals have 32 teeth when in the adult state. In man each half-jaw has eight teeth, those on corresponding sides being similarly shaped and arranged. There are *two incisors* in each half-jaw, situated nearest the middle of each jaw; the next one is called *cuspid*, *canine*, or *eyetooth*; the next two, *bicuspids*; and the next three, *molars* or *grinders*. The incisors and eyeteeth have one fang or root, while the others have two or three fangs. A dense substance resembling bone, called *dentine*, constitutes the greater part of the interior of the teeth. The crown of the tooth, which is exposed to wear, is covered by a protective sheath of *enamel*, a hard, white substance. It is the hardest of all animal textures and contains about 97 per cent of mineral matter. The root of the tooth is covered by *cementum*, which is formed of a

layer of true bone. Within the tooth is a pulp cavity filled with a soft and highly vascular substance called the *dental pulp*. The roots of the teeth are set in sockets of the jawbone, which is lined with a membrane that forms a soft cushion.

Children are born toothless, but soon begin to develop a temporary set of *deciderous* or *deciduous teeth*, called *milk teeth*. The first to appear are the incisors, which begin to cut through the gums at about the age of seven months. The first molars appear at nine months and the canines at 18 months, while the last of the molars do not appear until the age of two or three years. There are 20 deciduous teeth in all, the number consisting of eight incisors, four cuspids, and eight molars. The first set of teeth is usually still perfect at six years, but the jaws contain the crowns of all the second set, except the *wisdom teeth*. At that age the crowns of the permanent set begin to press against the roots of the milk teeth, and the latter slowly become loosened and drop out. The last of the permanent set to appear are the wisdom teeth, which are sometimes delayed until the age of 20 to 23 years. The grade-school period, from 6 to 12 years of age, is characterized by the resorption and shedding of the deciduous teeth and the eruption of the permanent dentition. It is, therefore, often called the period of mixed

dentition. The grade-school period is divisible into two parts: the early grade-school period, from 6 to 10 years of age, and the prepuberal period, from 10 to 12 years of age. The preschool age, between the second and the sixth years of life, is usually called the childhood period.

The lower teeth tend to appear earlier than the upper teeth. In addition, it is well to remember that in females the teeth tend to erupt earlier than in males, and that race, type, nutrition and the state of health, as well as mechanical conditions, cause marked variation in the time of eruption of the teeth. The entire mixed dentition period is a critical one and should be carefully watched as regards possible beginning of malocclusion. Since the denture is in a state of flux, premature extractions or prolonged retention of deciduous teeth, abnormal habits of the tongue and labial musculature, nail biting and other conditions may initiate widespread malocclusion. Accidents which at any other period might be considered minor have profound effects if they occur during this dynamic stage of transition from one dentition to the other.

Usually decay of the teeth results from portions of food being lodged between them and from a sediment called *tartar* being deposited, both tending to injure the teeth. Dentine, once broken off or lost through decay, is not restored. An injury of this kind is soon followed by further decaying of the tooth, which ultimately results in inflammation of the part containing the blood vessels and nerves, thus causing toothache and rapid wasting of the tooth structure.

Tegner (*těng-nár'*), ESAIAS, eminent poet, born in Kyrkerud, Sweden, Nov. 13, 1782; died in Vexjö, Nov. 2, 1846. He attended the public schools in the Wermland province until 1799, when he entered the Univ. of Lund, being graduated from that institution as master of arts in 1802. After serving there as tutor until 1810, he became Greek lecturer. In 1812 he was made professor and at the same time was ordained as clergyman of Stafje. His patriotic poem, "Sweden," won the prize at the Swedish Academy in 1811. In 1817, he published "Song to the Sun," and in 1824 completed "Frithiof's Saga, or the Story of Frithiof." He was made bishop of Vexjö in the same year and was a member of the national diet, representing the clerical party. His speeches in connection with public policy and legislation have a high repute in Sweden and Norway, many of them dealing with finance, literature, industrial development, and education. In 1840, he was stricken with temporary insanity but, after taking treatment at an asylum in Schleswig, he recovered in 1841 and continued to write. Among his writings not named above are "Iduna," "Axel," a romantic poem; and "Kron Bruden," an epical poem, and "The Children of

the Lord's Supper." "Frithiof's Saga" has been widely translated, a well-known translation of it into English having been made by Longfellow.

Tegucigalpa (*tă-gōō-sê-gāl'pă*), the capital of Honduras, on the Choluteca River, about 40 m. N.E. of the Gulf of Fonseca. It occupies a site 3,375 ft. above sea level and is surrounded by a fertile region, which has deposits of gold and silver. Among the important buildings are the cathedral, a national university, several public schools, and the government buildings. It has manufactures of clothing, machinery, and ironware. The city has a brisk inland trade. It was founded by the Aztecs and had some importance in the early history of Central America. Population, ca. 65,000.

Teheran (*tě-h'răn'*), or TEHRAN, the capital of Iran, in the province of Teheran, 68 m. S. of the Caspian Sea. The city is located on the southwestern slope of the Elburz Mts., in sight of Mt. Demavend, height 18,600 ft. It was long an inactive and poorly built city, but within recent years many improvements have been made. Among the principal buildings are the citadel-palaces of the Shah, the arsenal, and the residences of foreign legations. Many parks adorn the public places. Other features include the Mosque of Masjid-i-Shah. The manufactures include linen goods, hats, clothing, carpets, shoes, and machinery. It has a considerable trade in livestock, fruits, cereals, and merchandise. The climate is exceedingly hot in the summer time, for which reason many of the inhabitants occupy suburban residences in the highlands toward the north. Near the city are ruins of the ancient Rei, known in the time of Alexander the Great as Ragae, thought to be the birthplace of Harun-al-Raschid. During World War II an important inter-Allied conference was held at Teheran (November 1943), President F.D. Roosevelt, of the U.S.; Prime Minister Winston Churchill, of the United Kingdom, and Premier Joseph Stalin, of the Soviet Union, meeting there to discuss military strategy and postwar aims. Population, ca. 540,000.

Tehuantepec (*tă-wăn'tă-pěk*), a city in Mexico, in the state of Oaxaca, 14 m. from the Gulf of Tehuantepec. It is situated on the Tehuantepec River, which supplies water power, and has railroad connections with the Pacific and the Gulf of Campeche. The region lying between the Gulf of Campeche and the Gulf of Tehuantepec, an inlet from the Pacific, is known as the Isthmus of Tehuantepec and forms the narrowest part of North America, lying north of the Isthmus of Panama. It is 130 m. at the narrowest place. Several plans to construct a canal were projected at various times utilizing the Coatzacoalcas River a part of the distance, but were finally abandoned with the selection of the Panama route, and the isthmus is now crossed by a railroad line. The

TELAUTOGRAPH

town of Tehuantepec has manufactures of indigo, salt, cotton fabrics, and machinery. Off the coast are valuable fisheries, including those of pearl oysters. Tehuantepec trades in cereals, livestock, and manufactures. Cochineal, fruits, cereals, and grasses are produced in the vicinity. The place was occupied by the Zapotec Indians at the time of the Spanish Conquest, but was captured by Alvarado in 1522. Population, *ca.* 7,000.

Telautograph (*těł-ă'ô-grăf*), a telescriber service; a communications system for transmitting data, instructions, and simple diagrams instantly and automatically in writing to any number of receiving stations simultaneously.

The telautograph transmits simultaneously two signals, controlled by and proportionate to the plane coordinates of a writing stylus, translating these signals at a receiving point into similar coordinate positions of a writing pen. A third simultaneous signal controls motion in the normal plane, lifting and depressing the pen as required in writing motions. Signals controlling the paper feed are transmitted during non-writing intervals. Auxiliary circuits are required in complex systems for the selection of particular stations, "busy" locks, and similar functions. In practice, plane motion of the stylus is translated into rotary motion of two shafts by a system of arms and levers. A congruent system in the receiver reconverts the rotary motion to plane motion of the pen. Pressure of the stylus on the writing surface controls the signal which depresses the receiving pen onto the paper.

Tel-Aviv (*těł-ă-věv'*), the largest all-Jewish city in Israel. Located on the Mediterranean Sea, Tel-Aviv accommodates light-draft vessels and acts as a supply center for the scientific agricultural developments thriving in the interior of Palestine. Founded in 1909 as a garden suburb by Jewish residents of Jaffa, the city has grown rapidly through Jewish immigration and colonization. During World War I the city suffered a complete evacuation ordered by the Turks because of its inhabitants' pro-Allied sympathies. Thus the real expansion dates from after World War I, through the efforts of the Zionist movement as well as by an influx of European exiles before, during, and after World War II. It has developed into a modern city of schools, shops, hotels, boulevards, and homes, and has intensive cultural activity. Although originally located in an agricultural region, the city is today the center for a variety of industries. In addition to its food and chemical industries, it is now a center for the textile industry. During 1947 and 1948 the city was the scene of fighting as the result of Arab-Jewish strife over the partition of Palestine (*q.v.*). Population, *ca.* 200,000. See also *Israel*.

Telephony (*tě-lěŋ'ô-něj*), the alleged influence of a previous or dead husband of a woman upon



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VIEW OF TEL AVIV

the children fathered by a succeeding husband.

Telegraph (*těł'ê-grăf*), an instrument for sending messages, usually by means of electricity, over short or long distances. The name telegraph is from the Greek *tele*, "far," and *graph*, "to write," meaning *to write afar*. This term was first applied because the original telegraphic receiving instrument had an electromagnetic register, which recorded on a band of paper, in the form of dots and dashes, the signals sent over the wire. Practice soon indicated that the operator could receive the telegraphic message by the sound of the instrument even more readily than by the recorded dots and dashes. This led to the invention of a form of receiving instrument called the *telegraphic sounder*, which remained in almost universal use until the advent of printing telegraphic devices.

Practical efforts to send messages by the agency of electricity date from the early part of the 18th century. The first practical results were obtained by stretching a series of wires and suspending from the ends a number of light balls marked with the letters of the alphabet, the electric current moving the particular ball against which it was directed. Steinheil, of Munich, Germany, invented an electromagnetic machine in 1837, and Cook and Wheatstone, two Englishmen, in the same year secured a patent for a constant battery instrument. In the latter a double key was employed. When the operator tapped one key, a needle at the receiving end of the line

TELEGRAPH

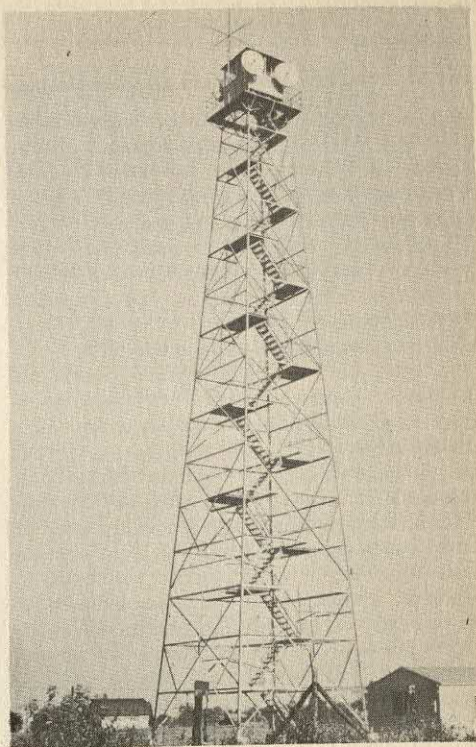
would swing to the left to indicate a dot, and a tap on the other key would produce a swing to the right to indicate a dash. Samuel F.B. Morse was the inventor of the first successful system of telegraphy. He constructed the first line over which a message was sent successfully at a long distance, the line being from Washington to Baltimore. The first message, "What hath God wrought?" was sent by Morse on May 24, 1844, to his partner, Alfred Vail. In 1910, nearly 90 per cent of the telegrams in the U.S. were still handled by Morse code. Now more than 95 per cent of the telegrams in this country are transmitted and received by printing telegraph methods. All important cities in the U.S. are now connected by direct trunk line circuits equipped for automatic printing telegraph operation.

The *multiplex* system, introduced in 1915, permits the transmission of as many as eight messages simultaneously over one wire, four in each direction, at high speed. The messages are typed by operators on keyboards similar to those of typewriters. As the keys are struck, holes are punched in a narrow moving paper tape. Letters of the alphabet and other characters are represented by combinations of five holes in the tape. The tape enters a transmitter, and the impulses, caused as if by electric contacts through the holes, flash out over the wire. Upon reaching the other end of the wire, the impulses are electrically translated back into characters and printed in letters on tape which the operator cuts and gums to a telegraph blank. The multiplex system, formerly much used on lines between important centers where traffic was heavy and constant, was replaced in time by more efficient telegraph systems.

The *teletypewriter*, also known as the *teletype-writer*, or *teletype*, was developed in the 1920's for use on short circuits where traffic is light. It is operated from a typewriterlike keyboard and sends signals directly over the telegraph line to a similar printer at the other end of the wire. The printer in the customer's office is connected directly with a similar machine in the city telegraph terminal, and messages are sent back and forth, making deliveries between the two points practically instantaneous. Thousands of branch telegraph offices also are operated by the use of teletypewriters.

The *Varioplex system* is an arrangement to provide greater flexibility and efficiency in the use of the telegraph lines. The Varioplex divides the large word-carrying capacity of a long-distance telegraph circuit between as many as 30 to 48 large companies that need direct, private telegraph lines to their offices or correspondents in other cities. In effect, it provides many more direct telegraph facilities over one multiplex circuit, without requiring the use of any more wires.

By use of the *carrier* system, it is now possible



Courtesy Western Union Telegraph Co.

RADIO BEAM TELEGRAPH TOWER

Towers, spaced from 30 to 50 miles apart, support reflectors, with radio antennas at their center, which are used to relay telegrams over very short radio waves from one radio beam telegraph tower to another

to send as many as 288 telegrams simultaneously over one pair of wires, and more than 1,000 telegrams simultaneously in each direction over a radio beam. Numerous different tones or frequencies are sent, and a stream of telegraph messages is transmitted by a group of operators on each frequency. The messages are received by telegraph printers connected with equipment tuned to the same frequency, just as a radio set in a home is tuned to receive a program from a broadcasting station.

With the *Telefax* a person can transmit his telegram by dropping it into a slot, just as he drops a letter into a mail box. The machine automatically wraps the telegram around a revolving cylinder in the Telefax cabinet and transmits the message over the line to a receiving machine where it arrives as an exact reproduction of the sent message. These facsimile machines are placed in many public places to provide around-the-clock service.

The most important telegraph facsimile development to date is the *Desk-Fax*, a miniature sending and receiving machine measuring only 10 x 11 x 7 in., which brings worldwide tele-

graph and cable service within arm's reach of the user. It is being placed in thousands of business offices to provide fast and direct telegraph service to and from the national telegraph system. To transmit a telegram, the user writes by hand or types the message on a blank, wraps it around the drum of the machine, and touches a switch. Thereafter the operation is automatic. When there is a telegram for the patron, a buzzer sounds. He places a sheet of recording paper on the machine and operates the start switch, whereupon the telegram arrives automatically.

A *radio beam telegraph* system, constructed by Western Union, has high towers 30 to 50 m. apart and utilizes super-high-frequency radio waves transmitted by directional beam. It will eventually eliminate the need for hundreds of thousands of miles of wire on the familiar pole lines between main telegraph centers. Since atmospheric static is not felt in the microwave region, radio beam transmission is unaffected by electrical disturbances. It eliminates service interruptions caused by ice, high winds, and falling trees. The beam system furnishes a vast increase in the number of circuits available for the handling of telegraph traffic, and provides amply for the telegraph growth of the future.

A new and highly mechanized system of telegraphy was placed in operation by Western Union in the late 1940's. A nationwide network of 15 ultra-modern *high-speed switching centers*, installed in a \$70,000,000 mechanization and plant improvement program, reduced the manual handling of telegrams to but one simple typing operation at the point of origin. Through these centers telegrams flash to their destinations without manual retransmission and at unprecedented speed.

The automatic switching centers permit the operators at the originating points to route telegrams to their destinations by simply transmitting two "call letters" at the beginning of each message. These call letters cause an "electrical brain" in the connecting switching center to select the proper circuit and automatically flash the telegram on to its destination. Incoming telegrams, addressed to points in a switching area, are received at the center on a telegraph device known as a "printer-perforator," which simultaneously prints the telegrams and punches combinations of holes in a paper tape. As each telegram arrives, a switching clerk presses a button marked with the name of the town or city of destination. This assigns the message to a circuit and causes the automatic transmission of the telegram to its destination.

The equipment at each of the new centers includes more than 3,000 miles of wire conductors and over a million soldered wire connections. To protect the intricate apparatus of these telegraph

centers against fire, an electronic smoke detection system, consisting of numerous constant light beams directed across the ceiling to photoelectric cells, was installed by the American District Telegraph Co. The slightest wisp of smoke intercepting one of these beams will set off the alarm system.

In 1950 the U.S. had the largest mileage (88,169 m.) of telegraph pole lines in the world, using 1,029,190 m. of wire. The use of the carrier system, however, multiplied the capacity of the wires, and considerably reduced the mileage required. The telegraphic "ticker" system continued to be used to report transactions on the New York Stock Exchange and other exchanges, and private leased wire networks, some of them nationwide, were available to large organizations.

Telemachus (*tê-lēm'-à-kŭs*), in Greek mythology, the son of Ulysses and Penelope. He was an infant at the beginning of the Trojan War and was left in the charge of Mentor, a trusted friend of Ulysses. After the close of the war, he went, accompanied by Mentor, in search of his father, whom they found as a beggar at the hut of a swineherd in Ithaca. After the identity of Ulysses was made known to the son, they formulated a plan to slay the insolent suitors of his mother, Penelope. After some of the suitors had been slain and others were driven from the place, the surviving suitors conspired to kill the youth, but he escaped through the aid of Minerva. It is related that he afterward removed to the island of Aea, where he married Circe, the fabled sorceress.

Telemetry (*tê-lēm'-ê-trī*), the technique of transmitting measurements automatically from a remote location. The term is usually applied to the communication of scientific data from unmanned aircraft, balloons, rockets, and artificial satellites. The signals are almost invariably transmitted by radio, and several "channels" (*i.e.*, paths of communication) are normally provided. For instance, an ordinary weather radio-sonde telemeters pressure, temperature, and humidity data. When more than one channel is transmitted on a single frequency, the process is called *multiplexing*. See also *Earth Satellite*.

Teleology (*têl-ê-ôl'-ô-jŭ*), derived from the Greek word *telos* or end, is the study of the nature and role of ends, purposes, goals, and final causes. The word is often used not only for the study of these matters, but also for the actual presence and operation of ends and purposes. Few philosophers have denied the occurrence of teleology or purposeful action in human affairs. However, many thinkers have maintained that all natural processes, and not only conscious ones, exhibit teleological characteristics, and that an element of purpose or direction toward fixed ends can be discovered everywhere. Such alleged de-

sign in nature has often been used as an argument for the existence of God.

Telepathy (*tê-lép'q-thĩ*), a term designating the transfer of thought from one human being to another, by means imperceptible to the sense organs, *i.e.*, by neither acoustical nor visual contact. Although some do not credit this unexplainable phenomenon, there are many who do believe that it is possible among certain persons and under certain circumstances. At least one American university conducts systematic research in telepathic phenomena, known as "extra-sensory perception," or "E.S.P."

Telephone (*têl'e-jôn*), an instrument for reproducing sound at a distance by the transmission of electrical impulses over wire line, cable, or radio. A number of individuals contributed to the development of the telephone. As early as 1837, methods had been devised to transmit the pitch of sounds. Articulate speech is generally considered to have been first transmitted in 1875, when Alexander Graham Bell (*q.v.*) produced an instrument transmitting the sound of speech. He filed a patent application early the next year. This patent was later upheld by the U.S. Supreme Court, following considerable litigation by Elisha Gray, Daniel Drawbaugh, and others.

Bell's telephone was exhibited and demonstrated at the Philadelphia Centennial Exposition in 1876. No battery or generator was used in Bell's circuit, which consisted simply of two magnetic transmitters. Each transmitter contained a long horseshoe magnet, supplied with soft iron pole-pieces. Around each pole-piece was wound a spool of fine wire, the two coils being joined together, with one free wire end connected to a single connecting wire and the other end connected to a return circuit through the ground. In front of the pole-piece was a diaphragm of thin sheet iron, which was secured firmly around its edges to the frame of the mouth-piece. Adjustment between the diaphragm and pole-pieces was made by means of a thumb screw. When the sound waves produced by the voice impinged on the diaphragm of the transmitter, they caused it to vibrate in consonance with themselves. This vibration caused the center of the diaphragm alternately to approach, and recede from, the magnet poles, and thereby induced corresponding currents in the coils around the pole-pieces. At the receiving station, these currents acted upon the magnetic field in the receiver, strengthening it or weakening it according to their direction, and so increasing or diminishing its attraction on the diaphragm, with the result that the latter reproduced the vibrations of the transmitter diaphragm and thus the original sound.

Instruments of the Bell type are now generally used as receivers only. In the modern receiver,

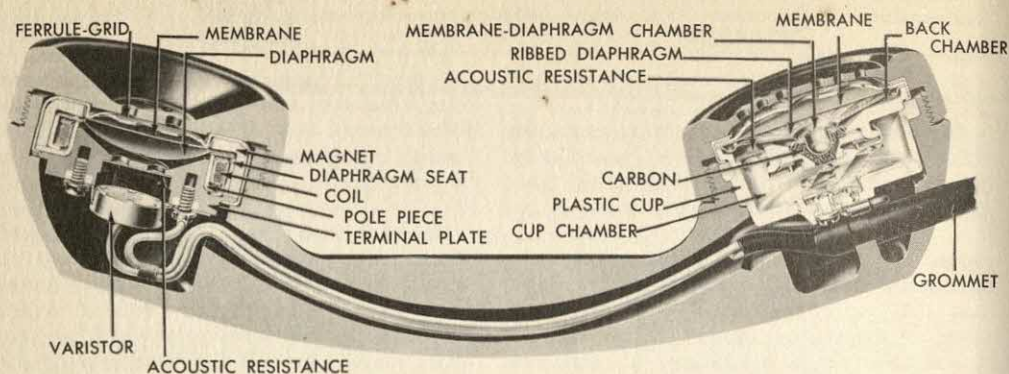
the magnet is greatly shortened, and the instrument is flattened into the form of a watch. The carbon-granule transmitter, which has replaced the Bell transmitter, utilizes a flexible aluminum diaphragm, which varies the electrical current in accordance with the speech waves by alternately compressing and freeing the carbon granules. The transmitter currents are supplied by batteries, which are usually located at the central offices.

The use of the induction coil with the telephone set was an early development, originally intended to increase the voltage of the alternating currents produced by the action of the transmitter. In modern telephone equipment, it has the added function of reducing the amount of the talker's speech heard in his own receiver. This later arrangement, known as the anti-sidetone circuit, is particularly important in the type of handset shown in the illustration, where both the transmitter and receiver are mounted on a single handle.

The first telephones were leased to individuals and business houses. Lines to connect homes and business houses and the connecting transmission lines were privately owned. It soon became evident that a more desirable arrangement would be obtained by connecting all the lines to a central station, so that each instrument could be connected to all other telephones in the same community. The first switchboard was established in New Haven, Conn., in 1878, with 21 subscribers. After 1920, automatic telephone exchanges, equipped to perform switching mechanically, came into widespread and increasing use.

An early difficulty in the transmission of telephone currents was overcome by Michael I. Pupin (*q.v.*) and George A. Campbell of Columbia Univ., in 1899. This invention consisted of a magnetic device, called a loading coil, capable of improving the transmission qualities of the telephone line. In 1892 a line *ca.* 900 m. long was completed between New York and Chicago. Later, with the development of the vacuum-tube amplifier, or repeater, communications over much longer distances became possible. In 1915 a line from New York to San Francisco made transcontinental telephony a reality. Repeaters utilize vacuum tubes with auxiliary coils and resistances, or, in some cases, transistors, to restore the strength of the original current at regular intervals along the line. In a telephone repeater station, weakened currents in long-distance lines are restored to normal strength before being transmitted to the next station.

The use of interconnecting telephone lines made possible the simultaneous transmission of a single radio program from widely scattered broadcasting stations, paving the way for network radio. Later, television was handled in the



Courtesy Bell Telephone System

MODERN TELEPHONE HANDSET

Cross section of a combination receiver (left) and transmitter (right)

same way by specially equipped coaxial cables (see *Cables*) and radio-relay circuits.

Since the end of World War II, tremendous strides have been made in providing communication channels for television transmission. Today, 79,000 channel miles of network facilities connect more than 550 television broadcasting stations in some 360 cities from coast to coast. In addition, most of the Bell System network is equipped to transmit color telecasts. The video network makes use of two types of communication facilities: *radio relay* and *coaxial cable*. Both types are also used for carrying telephone messages.

Radio relay is a system of beaming radio signals across the countryside from tower to tower. Differing from ordinary radio, this system uses very high frequencies, called microwaves, which are about the length of a cigarette. With these waves, the signal beam can be focused like a searchlight and relayed from one tower to the next. Today, radio-relay routes all over the country provide 12,000,000 m. of telephone circuits, or nearly one-quarter of the nation's intercity telephone-circuit mileage. They also furnish 80 per cent of the channels used in network television.

A recent development in microwave transmission was inaugurated in 1957, when the nation's first "over-the-horizon" television and telephone transmission system went into service between the U.S. and Cuba. Unlike conventional microwave systems, which use "line-of-sight" transmission, this system forces radio microwaves beyond the earth's curvature in a process known technically as "tropospheric scatter propagation." This system is equipped to carry 36 simultaneous telephone conversations plus one television channel in each direction; its ultimate capacity will be much greater.

Telephone conversations by radio across the Atlantic Ocean were inaugurated in 1927 between the U.S. and Canada and Great Britain.

Once introduced, overseas service spread rapidly. The first radiotelephone link utilized long-wave radio, but short-wave channels were soon added. Today, the Bell System Overseas network employs about 175 radio circuits.

In 1956 the world's first transoceanic telephone cable system linked the telephone systems of North America and Great Britain, and in the same year a deep-sea cable linked the U.S. and Alaska. In 1957 a third submarine telephone cable joined Hawaii and the North American mainland, and direct connections with the European continent were scheduled for 1959. Submarine cables give greatly improved service between overseas points, as they are free from the effects of magnetic storms which frequently interfere with radiotelephone conversations. By 1958, the U.S. was connected by overseas telephone with 121 nations and territories.

The telephone is an important part of America's social and business life. Almost 8 out of every 10 households have telephone service, and an estimated 240,000,000 telephone conversations are carried on daily. Although service is provided by more than 4,100 companies, the vast majority of the nation's 64,000,000 telephones are operated by the Bell System. Of the nation's telephones, about 80 per cent are dial-operated. In addition, about 5,000,000 telephone users can dial many of their long-distance calls to as many as 30,000,000 other telephones from coast to coast.

About 55 per cent of the telephones in the world are in the U.S., where 35.4 telephones serve every 100 people. At the end of 1957, there were *ca.* 64,000,000 telephones in the U.S. Approximately 54,000,000 telephones were in use in all other nations, most of them accessible from instruments in the U.S.

See also *Radio; Television; and color plates on Communication* in Volume II.

Teleprinter (tél'è-prin-tēr), or TELETYPE, a device resembling the ordinary typewriter, consisting of a single unit of apparatus for both send-

TELESCOPE

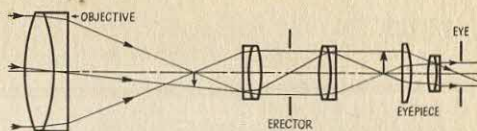
ing and receiving messages. It is made up of two independent instruments, the keyboard being an automatic transmitter and the type-machine being an automatic receiver controlled by line signals through its single receiving magnet. The receiving printer records what is transmitted as well as the incoming signals from the distant end. When the transmitting keyboard is operated, a rotating distributing mechanism sends out five-unit code combinations to the line. An electro-mechanical system in the receiving instrument distributes the code impulses and causes the type-machine to print on a tape or page characters corresponding to the code transmitted. In teleprinter operation, synchronous relations are maintained between units at opposite ends of the line by means of two additional impulses for each character of the intelligence code. One impulse is used to start the machines, the other to stop them following the transmission of each character.

Telescope (*tě'l'ě-skōp*), an optical instrument for forming a magnified image of a distant object or for making the object appear brighter by increasing the amount of light gathered and transferred to the eye. The telescope has two parts: an object glass, or mirror, for forming the image, and an ocular lens, or eyepiece, by means of which the image is viewed. A telescope intended for terrestrial use must have, in addition, an erecting lens for forming an upright image.

The objective of the terrestrial telescope is usually a converging lens of long focal length. It is made large in diameter to increase its light-gathering power. The ocular lens may be either converging or diverging and is of short focal length. The illustration shows a terrestrial telescope on a tripod stand. The object glass occupies the front end of the collapsible tube, which excludes extraneous light. The ocular is at the small end of the tube. Swivel adjustments permit turning the telescope in any direction.

For astronomical observations great light-gathering power is required of a telescope in order to render the images of faint stars visible. For the objectives of these telescopes both mirrors and lenses may be used. The objective lenses of astronomical telescopes range in diameter from a few inches to 40 in. in the case of the Yerkes telescope at Lake Geneva, Wis. The objective lens of this telescope, which is the property of the Univ. of Chicago, is 3 in. thick and weighs 762 lbs. The lens cost \$100,000 and the telescope and observatory cost \$500,000. Other refracting astronomical telescopes are the 36-in. telescope of the Lick Observatory in California, a 32-in. telescope at Meudon, France, and a 26-in. telescope at the U.S. Naval Observatory at Washington, D.C.

Reflecting astronomical telescopes utilize a large concave mirror ground of paraboloidal form on glass and silvered for gathering the light.



Courtesy Bausch & Lomb Optical Co., Rochester, N. Y.

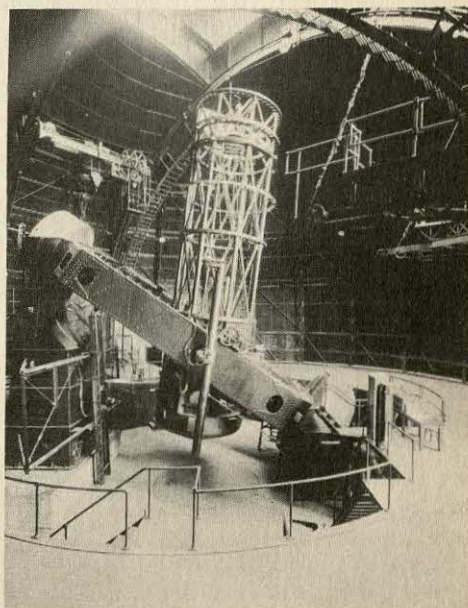
TERRESTRIAL TELESCOPE

The objective forms an inverted image as illustrated by the first vertical arrow. This image becomes an object for the erector lenses, which invert it again as shown at the second vertical arrow. The eyepiece lenses view this and the eye placed at the exit pupil sees an erect image of the original object.

More recently, however, silver reflecting surfaces have been replaced by aluminum reflecting surfaces. The reflector for the telescope at Mt. Wilson Observatory in California has a diameter of 100 in., completely aluminum surfaced. The picture shows the lattice work frame which supports this huge mirror and the "right ascension mounting" which regulates the telescope's east-west movement, as well as the "declination tube" containing the mirror which regulates the telescope's north-south movement. A clockwork mechanism moves the telescope so that it may follow the motion of a star. Many of the observations made with an astronomical telescope are photographic, but visual observations may also be made by an observer seated in the chair at the side of the telescope. A huge dome open at the top rotates with the telescope. A small telescope called a finder is located beside the large tele-

100-INCH REFLECTING TELESCOPE AT MT. WILSON OBSERVATORY

Courtesy Mount Wilson Observatory, Calif.



TRANSMITTER

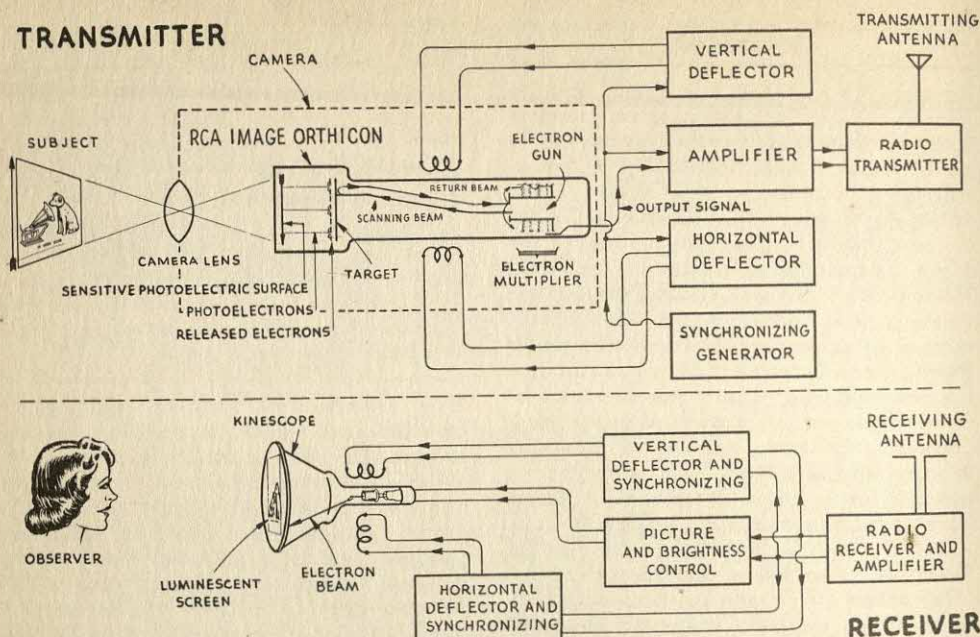


DIAGRAM EXPLAINING THE WORKING OF A TV TRANSMITTER AND RECEIVER

Courtesy RCA Victor, Camden, N. J.

scope for making preliminary adjustments.

A notable advance in the size of astronomical telescopes is a reflector 200 in. in diameter installed at the observatory of the California Inst. of Technology, Mt. Palomar, Calif., in 1948. This mirror, which is aluminum surfaced, possesses two times the light-gathering power of the Mt. Wilson mirror, or a potential billion light years in light gathering. A huge disk of pyrex glass is used for the mirror.

Television (tē'lē-vīzh-ūn), a system of transmitting, by radio signals, a rapid succession of images and recreating them in a manner similar to that used to produce motion pictures. Television—the name means, literally, “seeing at a distance”—has had its greatest development since 1930, although scientists have been working on it for more than 60 years. In its earliest form, television operation was based on the use of rotating disks at both transmitting and receiving stations. The disk was 2 ft. or more in diameter and perforated near its outer edge with a spiral of small holes. Intensely brilliant light at the transmitter passed through the small holes and struck the surface of the object to be televised. Reflected into light-sensitive photocells, the light was converted into electric currents and transmitted as a succession of radio signals.

This system had many drawbacks, so research scientists continued to seek a television system based solely upon electrons—the system currently in use. Modern television transmitters and receivers have no motors, disks, or other rotating parts, and the dimensions, details, and illumination of the reproduced pictures compare most favorably

with those of commercially produced motion pictures.

Most of the components inside a television receiver are similar to those in a standard-broadcast receiving set, except for the fact that television



Courtesy Bettman Archive

TELEVISION AS FORESEEN IN 1882

More than a century ago, an imaginative Frenchman envisioned television in every home

signals are transmitted on a very high frequency (VHF—channels 2 through 13), varying from 54 to 216 megacycles, or ultra high frequency (UHF—channels 14 through 83), varying from 470 to 890 megacycles.

Electrons do all the work in the present-day television system. Electronic cameras, using one of three principal types of tubes—Iconoscope, Orthicon, or Image Orthicon—scan the object to be transmitted, and, at the receiving end, cathode-ray tubes utilizing a very fine pencil of electrons rebuild the original object.

The credit for giving modern all-electronic television its start goes to the patented and epoch-making Iconoscope tube (1923), for which details were worked out by the vice president and technical consultant at the laboratories of the Radio Corporation of America (RCA), Dr. Vladimir K. Zworykin.

In the Iconoscope, a standard camera lens focuses the scene on a light-sensitive plate called the mosaic, consisting of millions of minute drops of silver which have been treated with caesium to make them electrically sensitive to light. As the light from the object strikes the particles, small charges of electricity are created on them.

Where the light is brightest, the charge will be greatest. A beam of electrons projected at a very high velocity from an electron generator, or gun, in the neck of the Iconoscope, sweeps back and forth across the mosaic in a carefully controlled pattern. As the electron beam strikes the silver particles, the charges are released and are passed into an amplifier, which magnifies them millions of times in order finally to form or modulate the wave radiated from the antenna of the transmitting station.

From this development came the Orthicon camera tube (1939) and the Image Orthicon (1945).

The receiving system for television consists of a special antenna, called a dipole, and a kinescope or picture tube, on the face of which the original scene is recreated. The dipole is a combination of tuning and amplifying circuits which are necessary to select the transmitted signals and build them up to suitable strength.

After the incoming signal has been selected and amplified in the normal manner of radio sets, it is led to the kinescope. The kinescope is a funnel-shaped cathode-ray tube, containing a generator of electrons, called the "gun," several coils

SCENE IN A TELEVISION STUDIO

NBC Photo



which control the movement of the electron beam (up and down and from side to side), and a screen on which the picture appears. This screen, painted on the inside surface of the tube face, consists of a thin layer of luminescent material, which glows with a bright fluorescence when hit by an electron beam.

In scanning a television picture, an electron beam, about the size of a pinhead, moves in a series of 525 parallel horizontal lines, guided by the deflecting coils (electrostatic focus—1951). The television industry has adopted the "interlace" method, after experimenting with various scanning procedures. This method consists of scanning the odd-numbered lines—i.e., 1st, 3rd, 5th, 7th, etc., to the bottom of the picture and then returning almost to the starting point to scan the even-numbered lines—2nd, 4th, 6th, etc. In this way the appearance on the screen of 60 half-images every second tends to eliminate flicker and thus reduce eyestrain.

Beginning in the early 1930's, the growth of the television industry was slow but steady, and technical advances caused the public to fear rapid obsolescence of apparatus. The demands of other communications services for wave lengths in an already crowded spectrum caused television stations to be uncertain they could retain their wave lengths.

When the original allocation (1945) of television frequencies was made by the Federal Communications Commission (F.C.C.), room could be found for only 12 channels in the part of the radio spectrum then thought most suitable for video signals. These channels require six times as much space on the radio spectrum as the entire range of frequencies assigned to AM broadcasting. Each television channel is six megacycles in width.

Under the 12-channel system (in what is known as the VHF band), no metropolitan area could have more than seven stations, and large cities no more than one or two. More channels had to be found. The only place to look for more was on up in the ultra-high frequency band (UHF).

Under a "freeze" imposed by the F.C.C. in September 1948, in order to permit a revision of technical standards, no new stations were to be authorized. In 1948 there were 108 television stations in operation; but by Jan. 1, 1954, there were 464 in operation.

After complex hearings and investigations, the F.C.C. on March 22, 1951, opened up 70 channels in the UHF region between 470 and 890 megacycles. The plan could accommodate almost 2,000 stations, not all for commercial purposes, however, for the F.C.C., in response to educational groups, "reserved" for an indefinite period some 250 UHF channels for educational noncommercial

stations. In early 1960 there were 46 educational television stations in operation and about a dozen more scheduled to go on the air during the year. As of April 1, 1960, the total number of operating stations stood at 563, including 87 UHF stations.

The future growth of television as a national medium could not be questioned after the East and West coasts were interconnected, in late 1952, via the coaxial cable. Programs from entertainment centers like New York, Hollywood, and Chicago to other cities and towns are distributed by microwave systems or the coaxial cable. Microwave systems are low-powered, automatic stations placed in a row on high points between cities. The original signal is picked up by one relay, given additional power, and directed in a straight line to the next relay point, and so on until the desired city is reached. The coaxial cable stretches many thousands of miles, east to west, north to south, and these facilities were due for rapid extension by the American Telephone and Telegraph Co.

A worldwide television system is expected to be possible in the not too distant future as a result of advances in the art of telecommunications and the exploration of space (see *Astronautics*). Two transmission techniques have been proposed. One envisages the use of transmitters powered by solar batteries in earth satellites which would retransmit programs received from the earth. The other proposed system would use a large, metal-covered sphere orbiting, with the earth as a passive reflector from which TV signals could be bounced back to earth.

The feasibility of the first system was demonstrated in April 1960 when the U.S. launched a weather satellite which successfully transmitted television pictures of cloud formations covering the earth back to ground receiving stations.

Although the bulk of the television transmissions are in black-and-white, color grew in acceptance during 1959 and 1960. Approximately half of the network-affiliated stations were equipped to rebroadcast programs in color, and a few installed the necessary equipment with which to originate color shows. In early 1960 it was estimated that about 600,000 color sets were in use.

The development of standards for color television transmissions extended over a long period of time. Just prior to World War II, the Columbia Broadcasting System (CBS), demonstrated a system which entailed the use of a tricolor filter rotating in front of the picture tube. Although the system rendered good quality pictures, it was not compatible with black-and-white transmission, and therefore black-and-white pictures could not be received on regular



THE TELEVISION CAMERA TAKES TO WHEELS

A Dumont mobile camera unit brings realism into TV drama by moving into a hospital in Orange, N.J., and following the progress of a surgical operation

television sets when color shows were being transmitted.

In 1946 RCA demonstrated its all-electronic, compatible color system. Color TV systems also were shown at about the same time by Color Television Inc. and Chromatic Television Laboratories.

Following a series of lengthy, and at times bitter, hearings, the F.C.C. ruled on Oct. 10, 1950, that only the CBS system was ready for commercial use. It therefore established standards for color transmission based on this system.

Set production had hardly started, however, when the government banned further manufacture on the grounds that essential technicians and materials could not be diverted from the Korean war effort.

The color controversy was finally resolved in December 1953 when, after another series of hearings, the F.C.C. approved color television standards based on the compatible system developed by the all-industry National Television System Committee, sponsored by the Radio-Television Manufacturers Assn. This system, which is currently used, utilizes a tricolor picture tube and is similar to the system developed by RCA.

In addition to transcontinental telecasting, better programming was made possible by the development of smaller, more efficient mobile apparatus and radio relays which could be rushed to the scene of outdoor special events in order to convey the camera signals back to the main transmitter. Several microwave transmitters of this advanced type were used with tremendous success at the Presidential inauguration in January 1953 and sent by all networks (CBS, NBC, ABC, and Dumont) to all parts of the U.S. When used in conjunction with the supersensitive Image Orthicon tube, the microwave transmitter provides excellent facilities for picking up any event, day or night, within 30 to 40 m. of the main transmitter.

The complete story of the importance of television in the development of radically new and secret arms for the military cannot be told, as yet. However, pilotless planes called "drones" and certain forms of missile guidance depend upon television for their effectiveness. Out of further specialized military research and development came better television cameras and receiver tubes with longer life, brighter and clearer screen images, and, in the case of cameras, a gain in sensitivity 100 times greater than that previously attainable.

The television industry, within the relatively few years of its existence, has become one of the major industries of the U.S., providing employment to many thousands of people. An estimated 56,000,000 TV receivers were in use in 1962, compared with only 8,000 in 1946. Some 47,886,600 of the total 53,239,500 U.S. homes contained TV receivers, or at least one set in nine out of ten households. Television was viewed in 47,000,000 homes, an estimated average of 5 hr., 22 min. a day in 1961.

Tell (*têl*), WILLIAM, legendary Swiss patriot, who, according to historical accounts, rescued his native land from Austrian oppression in the 14th century. Tell lived in the canton of Uri, which had joined Schwyz and Unterwalden in a confederacy against Gessler, the tyrannical Austrian governor. Gessler ordered that all persons passing the market place of Altdorf should salute the ducal hat of Austria which had been placed there on a pole. Tell refused to obey this order and as a penalty was forced to shoot an apple from the head of his own son. He accomplished the feat successfully, but revealed that he had concealed another arrow with which to shoot Gessler in the event of his son's death. He was accordingly imprisoned and conveyed across Lake Lucerne, but on nearing the shore leaped from the boat and escaped. He later freed Switzerland by sending an arrow through the heart of Gessler. The extended war between Albert I of Austria and the Swiss peasants continued for nearly 200 years, with intervals of peace, until peace was concluded in 1499. Particularly associated with the battle of Morgarten, in 1315, he is believed to have drowned in the Schächen River, in 1350, while rescuing a friend. Tell is the subject of a play, "William Tell," by Schiller and

of an opera (see *William Tell*) by Rossini.

Tell el-Amarna (*têl-êl-ä-mär'nä*), the name given to the ruins of Ekhaton, a city of Upper Egypt built by Amenhotep IV as the new capital of his empire (*ca.* 1350 B.C.), situated near the east bank of the Nile, 190 m. above Cairo. The court moved to Ekhaton in place of Thebes, after Amenhotep replaced worship of the idol, Ammon, with worship of Aten (the sun). After Amenhotep's death, Thebes again became the capital, and Tell el-Amarna, after an existence of only a few decades, was abandoned. Although the city has not since been inhabited, it is possible to trace the ground plans of buildings and general lines of the streets. One of the chief ruins is the royal palace, in which four fairly well-preserved painted stucco pavements were discovered in 1891-92. Other invaluable relics, discovered in 1887, are more than 300 clay tablets inscribed with cuneiform characters, which are letters and state documents addressed to Amenhotep IV and his father.

In the hills of Ekhaton are two famous groups of rock tombs, inscribed with hymns to the sun god and decorated with pictures of scenes executed in a naturalistic style that is unlike the contemporary (abstract) art of Egypt. Parts of the tombs were occupied by the Copts (*q.v.*) during the early centuries of Moslem rule, and one tomb was converted into a church. See also *Amenhotep IV*.

Teller (*têl'êr*), EDWARD, physicist, born in Budapest, Hungary, Jan. 15, 1908. A student and research associate at German universities, he held a Rockefeller fellowship in Denmark in 1934 and became a professor of physics at George Washington Univ. in 1935. Specializing in nuclear physics, he went to the Inst. of Nuclear Studies, Chicago Univ., in 1945 and to the Univ. of California Radiation Laboratory in 1952. Concentrating on atomic and hydrogen-bomb research (from 1941 to 1951 he was active at the Manhattan Project and at Los Alamos, N.M., *qq.v.*), he has often been referred to as the "father of the hydrogen bomb" (*q.v.*). Teller is the author of "The Structure of Matter" (with Francis Owen Rice, 1948) and other works.

Téllez (*ta'lyâth*), GABRIEL. See *Tirso de Molina*.

Tellurium (*tê-lû'rî-ûm*), a gray, metallic-appearing chemical element (symbol, Te; atomic weight 127.60; atomic number, 52), resembling sulfur in its chemical properties. Its principal use is as an alloying agent; when added to copper and lead, it improves their properties for some purposes. Tellurium was discovered in 1782 by Franz Müller von Reichenstein, and the discovery was confirmed later by the German chemist M. H. Klaproth, who actually separated the element. Tellurium is brittle, but not hard. It forms several compounds, including an oxide, and the element and its compounds are poisonous.

TELL EL-AMARNA

Amenhotep IV with his Queen Nofretete



Temenos (*tēm'ē-nōs*), an ancient Greek term for a piece of land consecrated as a temple or sanctuary.

Temesvár (*tē'mēsh-vār*). See *Timisoara*.

Temiskaming (*tī-mīs'ka-mīng*) or TĒMIS-CAMINGUE, a lake of Canada, formed by a widening of the Ottawa River. It extends for some 60 m. on the border between Ontario and Quebec.

Tempe (*tēm'pē*), a narrow valley in northern Greece, through which flows the Peneus River. It is situated between Mt. Olympus and Mt. Ossa, in Thessaly. It was sacred to Apollo and was celebrated by the ancients for its beauty. In places the valley narrows so as to leave passage only for the river and a road.

Temperament (*tēm'pēr-ā-mēt*), in psychology, the behavior and personal reaction of an individual toward his surroundings and experiences, determined by a combination of physical moral, and mental qualities. The ancient Greeks distinguished between four temperaments: the sanguine (cheerful), the phlegmatic (slow), the choleric (excitable), and the melancholic (sad). However, this subdivision into four so-called cardinal humors is too general for modern psychological use. See also *Psychiatry*; *Psychology*; *Somatology*.

Temperance (*tēm'pēr-āns*). See *Prohibition*.

Temperature (*tēm'pēr-ā-tūr*), the intensity of heat of a body, measured by a thermometer and expressed in degrees; in a more technical sense, the thermal state of a body considered with reference to its ability to transfer heat to other bodies. High temperatures are conveniently brought about by electrical means such as the heating of a wire by the passage of electric current, or the electrical excitation of a gas, and by high-frequency induction heating of iron. Other means employ chemical reactions, such as the oxidation of various substances or the recombination of hydrogen atoms as in the atomic hydrogen torch. The high temperatures existing in the sun are considered to result from nuclear chain reactions involving carbon, oxygen, and nitrogen. Very low temperatures are obtained by refrigeration methods employing the principle that a gas under pressure cools on expansion and in so doing extracts heat from its surroundings. A magnetic cooling effect has been employed in connection with these methods to obtain the lowest temperature (-272.38°) attained so far. There is no connection between absolute zero and the lowest temperature measured. Absolute zero is an international constant, obtained from the Second Law of Thermodynamics (see also *Thomson, William*).

Temperatures of living organisms are maintained by oxidation of various substances present. In man the normal body temperature is 98.6° F. or 37° C. This may fluctuate somewhat as a re-

sult of exercise, exertion, or eating, but extremes of 106° (as in fevers) or 93° are usually fatal.

A few interesting temperatures are enumerated: The temperature of a stellar interior is estimated at $72,000,000^{\circ}$ F., while the temperature of interstellar space is considered to be -454° F. The temperature of the coldest climate (Alaska) is -82° F. (63.3° C.) while that of the hottest (Tripoli) is 136.4° F. or 58° C.

The *critical temperature* of a gas is the temperature above which the gas cannot be liquefied by application of pressure no matter how great the pressure applied.

The International Temperature Scale standardizes procedures for determining temperatures from -182.970° C. (the boiling point of oxygen) to about $4,000^{\circ}$ C. To determine the upper ranges of temperature, Planck's law (see *Planck, Max*) is used to show the relation between temperature and the energy radiated, with the second constant of radiation set at 1.438 cm-degrees. The temperature of 960.8° C. is defined as the melting point of silver.

Tempering (*tēm'pēr-īng*), the process of producing a determined degree of hardness in metals, especially iron and steel. Hardness is that property by which certain substances resist being worn or scratched by others. However, the terms *hard* and *soft* are used only in a relative sense (see *Hardness Scale*). Thus, glass is considered hard when compared with marble, but it is soft as compared with the diamond, since it is scratched or cut by the diamond. Steel possesses the property of being easily hardened or tempered, and it is possible to obtain almost any degree of hardness in this metal. The process consists in plunging the steel, when raised to a red heat, into a cold liquid, which will cause it to become hard. To temper it properly for the purpose desired, as in making knives and razors, it may be made excessively hard and then reduced by gradually reheating. Razors and surgical instruments are made from steel heated to about 450° Fahrenheit and then plunged into cold water or oil.

Templars (*tēm'plērz*), or KNIGHTS TEMPLAR, one of the three great religio-military orders founded in the 12th century, the other two being the Hospitallers and the Teutonic Knights. The Templars were founded in Jerusalem by Hugues de Payns and Godeffroi de St-Omer among others, to keep open the road to the Holy Land and protect the pilgrims who were flocking there after the First Crusade. The new order was given lodgings near the so-called Temple of Solomon, whence their name. It was formally confirmed by Pope Honorius II in 1128.

The Templars grew rapidly in numbers and wealth. By royal grants they were soon in possession of lands and houses in most of the Christian kingdoms. The Popes favored them, and they

were allowed freedom from excommunication (except by the Pope himself) and freedom from taxation, and had the privilege of having their own churches. Such favoritism brought them into immediate rivalry with local churchmen and local governments. But so long as the attention of Europe was fixed on regaining the Holy Land the Templars were all-powerful.

The order became the guardians of kings, the channel of trade and diplomacy between East and West, the international bankers of their time. They were the predecessors of the great banking families such as the Medici. But in the East they suffered heavy losses of manpower and fortune with the defeat of the Christians by the Saracens. They withdrew from Jerusalem to Antioch, from there to Acre, and finally, in 1291, to Cyprus, which from then on was the headquarters of the order.

The Templars were brought down by Philip IV of France, and Pope Clement V. In 1307, charges of heresy and secret rites were brought against them, and their grand master, Jacques de Molay, brought to trial, publicly confessed, although he later recanted. The order was disbanded in 1312 and much of their great wealth was given to the Knights of St. John.

Their destruction by king and Pope gave powerful sanction to the belief in witchcraft (*q.v.*) and the use of torture in trials—two blights which hung long thereafter over medieval and later Europe.

Temple (*tem'pl*), a building designed for religious worship. In some countries the term is used synonymously with church and even with mosque, but it has special reference to the chief sanctuary of the Jews, the Christian churches constructed by the Knights Templar, the Protestant places of worship in France, and the edifices erected in various pagan countries. Solomon, King of the Jews, built the most remarkable temple in the historic period of the world. It was located on Mt. Moriah, in Jerusalem, and was constructed of stone and the cedar of Lebanon. The length was 60 cubits; the width, 20 cubits; and the height, 30 cubits. It was divided into two parts, the outer sanctuary or Holy Place, and the Holy of Holies; the former was 20 by 40 and the latter 20 by 20 cubits. Within the Holy Place were the showbread table, the altar of incense, the seven-branched candlesticks, and 10 smaller tables and candlesticks. The Holy of Holies contained the Ark of Testimony, sheltered by the outspread wings of two cherubs. Nebuchadnezzar destroyed the temple in 586 B.C., but the Jews erected a new edifice on the same site after returning from the Babylonian captivity, in 516 B.C. It was rebuilt by Herod the Great in 18 B.C., and his structure was the one from which Christ expelled the merchants and money changers. It

remained intact until A.D. 70, when it was completely destroyed by the Romans. In the time of Constantine the Jews sought to rebuild the temple on the same site, and another attempt was made by Julian, but both attempts proved futile. The ground is now occupied by a Moslem place of worship, known as the Mosque of Omar.

Temples dedicated to particular deities were very common in Greece and Rome. Such edifices, in fact, were the principal architectural features of most ancient peoples. Many of the ruins in Egypt, Greece, Rome, and even China give evidence that these structures were of large size and contained the greatest treasures of ancient civilizations. Temples of considerable note are found in China and other countries of Asia, which in form do not differ materially from those of Greece and Rome. See also *Architecture*; *Art*; *Column*; *Pagoda*; *Synagogue*.

Temple, a city in Bell County, Texas, about 135 m. s.w. of Dallas, 146 m. N.E. of San Antonio, on the Missouri, Kansas & Texas and the Santa Fe R.R.'s. The surrounding country is in the fertile Texas Blackland Belt. The points of interest include the McCloskey Veterans Administration Hospital and Temple Junior Coll. Camp Hood, a U.S. Army base, is near by. The manufactures include shoes, furniture, clothing, machinery, woodwork, cement blocks, rock-wool insulation, and candy. It is the wholesale and retail center of central Texas. Temple was founded and incorporated in 1881. Population, 1950, 25,467.

Temple, FREDERICK, Archbishop of Canterbury, born at Leukas, in the Ionian Islands, Nov. 30, 1821; died in London, England, Dec. 23, 1902. He was educated at Balliol Coll., Oxford, and in 1846 was ordained for the ministry. In 1855 he became headmaster at Rugby. He was appointed bishop of Exeter in 1869, bishop of London in 1885, and archbishop of Canterbury in 1896. He presided over the World Temperance Congress in London in 1900, and in 1901 he officiated at the coronation of Edward VII. His publications include "Essays and Reviews" and "Relations Between Science and Religion." His son, William Temple (*q.v.*), also became archbishop of Canterbury.

Temple, SHIRLEY JANE, actress, born in Santa Monica, Calif., April 23, 1928. After playing small parts in motion pictures from the time she was three years old, she won widespread acclaim for her performance in "Stand Up and Cheer" (1934). In a short time she became one of the most popular child actresses in motion-picture history. She appeared in a total of 25 features and 20 shorts before her career seemingly ended when she was 13 years old. She made a brief comeback in 1945 in the film "Kiss and Tell" and then made four motion pictures in 1947 and three in 1948. She did not perform

again publicly until 1958, when she became hostess and narrator for an N.B.C. television series of fairy tales called "Shirley Temple's Storybook." She also acted in one of these productions, "The Legend of Sleepy Hollow."

Temple, WILLIAM, archbishop of Canterbury, born in Exeter, England, Oct. 15, 1881; died in Canterbury, Oct. 26, 1944. He was educated at Oxford Univ. where he was president of the Oxford Union, and later (1904-10) a fellow and lecturer in philosophy. Ordained in 1909, he was headmaster of Repton School (1910-14), rector of St. James', Piccadilly (1914-18), and canon of Westminster (1919-21). He was bishop of Manchester (1921-29), archbishop of York (1929-42), and archbishop of Canterbury from 1941 until his death. Interested in social and economic reform, he was the first president (1908-24) of the Workers' Educational Assn. He also led the movement for a world council of churches. He was the author of numerous religious and philosophical works, including "Christianity and the State" (1928), "Nature, Man, and God" (1934), and "The Church Looks Forward" (1944).

Temple, SIR WILLIAM, statesman, born in London, England, in 1628; died in Moor Park, Surrey, Jan. 27, 1699. Educated at Cambridge, he traveled on the Continent for six years before entering government service in 1661. First a member of the Irish parliament, he returned to England in 1663, and in 1666 was appointed English representative at Brussels, receiving a baronetcy at the same time. In 1668 he concluded a tripartite treaty between England, the Netherlands, and Sweden, and was named ambassador to the Netherlands. A change of English policy led to his recall in 1671, and he spent the next years writing "Observations on the United Provinces" (1672) and a number of political essays later published in "Miscellanea" (1679). In 1674 he was again named ambassador to the Netherlands, where he arranged (1677) the marriage of William of Orange and Mary of England (see *William III*). After he retired in 1681, he wrote political essays, his secretary at various times being Jonathan Swift (*q.v.*), who helped prepare his "Memoirs" (1691, 1709). One essay, "Of Ancient and Modern Learning" (1690), caused a literary controversy that led Swift to write "The Battle of the Books" (1697).

Templer (*tēm'plēr*), SIR GERALD, soldier, born in Ulster, Ireland, Sept. 11, 1898. He was educated at the Royal Military Coll. at Sandhurst and in 1916 joined the Royal Irish Fusiliers, with whom he fought in World War I. In 1935, after attaining the rank of brevet major, he was assigned to Palestine. In World War II, he was at first an intelligence officer and was later attached to Field Marshal Montgomery's

headquarters. After the war, he was, in quick succession, director of military government in the British zone of Germany, director of military intelligence at the war office, London, and commander of the Eastern command. From 1952 to 1954 he was British high commissioner in Malaya, where he instituted many political reforms and prevented Communist infiltration. After his return to England, he was imperial staff chief (1955-58), and in 1956 was named field marshal.

Templewood (*tēm'p'l-wōōd*), VISCOUNT. See *Hoare, Samuel*.

Tenacity (*tē-nās'ī-tē*), the power of a substance to resist being pulled apart or broken, sometimes called tensile strength (*q.v.*). It is due to the cohesion of the molecules, for which reason tenacity varies greatly in different substances. The length of a bar or beam does not affect the number of molecules in the area of a given cross section. However, a long beam is likely to have a flaw or weak spot, and so may be less tenacious than a short beam, since it inclines to break at its weakest part. Wood is more tenacious in the direction of its fibers than in the transverse direction, and metals usually have greater tenacity in the longitudinal direction. In most cases the simple metals have less tenacity than those which are mixed. In fibers, tenacity is called fiber strength (expressed as grams per denier). Fiber strength cannot be equated with tensile strength unless the density of the fiber is taken into account (see also *Fiber*).

Tenant (*tēn'ant*), one who holds or possesses, temporarily, real estate, the title of which is vested in another, known as the *landlord*. Such an occupant usually has possession under the terms of a lease, whereby the relation of the landlord and tenant is created. A tenant who builds on a leased site becomes the landlord of those who rent from him. If an occupant has possession on no fixed terms, but with the will and knowledge of the landlord, he is said to be a tenant at will, and the occupancy can be terminated at the will of either party. Where two or more persons have possession of lands or holdings, each is called a tenant in common. A tenant farmer works the soil of the landlord, paying rent either in cash or in produce. See also *Sharecropper*.

Ten Brink (*tēn brīngk'*), BERNHARD EGIDIUS KONRAD, philologist, born in Amsterdam, Holland, Jan. 12, 1841; died in Strasbourg, France, Jan. 29, 1892. Educated at Düsseldorf, Münster, and Bonn, he was professor of modern languages at Marburg (1870-73) and professor of English at Strasbourg (1873-92). His writings (including "*Chaucer's Sprache und Verskunst*," 1884, and "*Beowulf-Untersuchungen*," 1888), revived interest in Chaucer and Old English literature and

were indirectly responsible for founding the English Chaucer Society.

Ten Broeck (tĕn brōōk'), ABRAHAM, soldier and jurist, born in Albany, N.Y., May 3, 1734; died there, Jan. 19, 1810. A member (1775-77) of the New York provincial congress, he became (1775) brigadier general of the Albany and Tryon County militia and participated in the battle of Bemis Heights (1777). He served (1781-94) as first judge of the court of common pleas of Albany County and was mayor of Albany (1779-83, 1796-99).

Tench (tĕnch), the name of a fresh-water fish of the carp (*q.v.*) family, very common in England and Western Europe, where it is kept as an ornamental fish in ponds. Rarely more than 14 in. long, it is greenish or yellowish, chunky, with very small scales, and soft, rounded fins. It is a bottom feeder and spends the winter in a torpid state in the mud. So far, attempts to introduce the tench in the U.S. have had little success. It is best established in Rocky Mt. streams and in California.

Ten Commandments (tĕn kò-mănd'ments). See *Bible*; *Decalogue*; *Moses*.

Ten, COUNCIL OF, a tribunal organized (1310) in the republic of Venice to deal with public safety. It was originally composed of ten members, then expanded to 17. The council soon extended its interests to include foreign affairs, finance, and crime. Acting through the Venetian inquisition (not connected with the Church institution) and a secret police, it investigated all crimes and judged the cases in secret, with no right of appeal. It was the most powerful and feared body in Venice until the republic fell in 1797.

Tender (tĕn'dēr), a legal term meaning an offer for acceptance in order to discharge a debt. The term is usually used to mean an offer of money (known as legal tender), but it can also designate an offer to do work, perform an act, or supply specified goods or services. A valid and lawful tender complies with all conditions of performance—time, place, manner, and having no conditions attached to it. See *Legal Tender*.

Tendon (tĕn'dūn), in anatomy, white fibrous tissue which connects the end of a muscle with the bone that it is intended to move. Some tendons are formed like a broad ribbon, others are cylindrical, and still others are thin like a sheet. A tendon is neither elastic nor extensible and thus immediately transfers the motion imparted by the contraction of the muscle to the bone into which it is inserted. In many cases the tendons are long and slender, *e.g.*, those extending from the muscle in the upper part of the forearm to the fingers.

Tendon of Achilles. See *Achilles*, *Tendon of*.

Tendron (tăŋ-drôn'), MARCEL (real name of MARC ELDER), author, born in Nantes, France, in 1884. Among his writings are the novels "*Une Crise*" (1905), "*Le Peuple de la mer*" (which won the Goncourt Prize, 1913), and "*Jacques et Jean*" (1931).

Tenebrae (tĕn'ĕ-brĕ), a ceremony of the Roman Catholic Church, sung during Holy Week, commemorating the suffering and death of Christ. As the choir sings a plainsong, candles set on a hearse are gradually extinguished until only one light remains.

Tenerife (tĕn'ĕr-ĭf) or TENERIFFE, an island of Spain. It is the largest of the Canary Islands, and forms the main part of the province of Santa Cruz de Tenerife, *ca.* 1,000 m. s.w. of Lisbon and *ca.* 150 m. n.w. of the coast of West Africa. The island is irregularly shaped, about 60 m. long and 30 m. across its greatest width, with an area of *ca.* 790 sq. m. Most of the coast is highland and characterized by plains, valleys, and mountains. A volcanic peak, Pico de Texde (*ca.* 12,200 ft. high), occupies more than one-half of the island. Bananas, sugar cane, fruit, almonds, tomatoes, and potatoes are grown in the fertile valleys; and there is extensive timber in the elevated areas. Goats and sheep are raised. In addition to tourism, the principal industry is processing the island's agricultural and fish produce; and embroidery and linen are exported. Santa Cruz, the capital of Tenerife and the Canary Islands, and La Laguna are the chief seaports. Population, *ca.* 260,000.

Teniers (tĕn'yĕrz), DAVID, known as THE YOUNGER, painter, baptized in Antwerp, the Low Countries, Dec. 15, 1610; died in Brussels, April 25, 1690. He was a son of David Teniers (1582-1649), a Flemish painter under whom he received instruction. The younger Teniers became a master in the painters' guild in Antwerp in 1633, and was dean in 1644. In 1651 he moved to Brussels. He produced hundreds of paintings—scenes and incidents in rural life, landscapes, and genre scenes depicting soldiers and craftsmen, alchemists, and physicians. His work was so much in demand that he employed assistants in his studio, which partially explains the uneven quality of his later work. His patrons included Archduke Leopold William, governor of the Netherlands. Among his paintings are "The Prodigal Son" (1634), "The Archers of Antwerp" (1643), "Meeting of the Civic Guards" (1643), and "The Village Fete" (1643).

Tenison (tĕn'ĭ-s'n), THOMAS, Anglican prelate, born in Cottenham, England, Sept. 29, 1636; died in London, Dec. 14, 1715. He was educated at Cambridge and became a fellow there in 1659. In 1680 he was made rector of St. Martin-in-the-Fields, London; he also gained prominence as a preacher, author of theological tracts, and

founder of a free library. He became bishop of Lincoln in 1691 and archbishop of Canterbury in 1694 and later founded the Society for the Propagation of the Gospel. One of the seven lord justices representing William III during his absence from England in 1695, he was present at the king's death (1702) as he had been (1694) at that of Queen Mary, for whom he preached the funeral sermon. An active supporter of Hanoverian succession, he served (1706) on the commission for union with Scotland. He did not win the favor of Queen Anne, but on her death in 1714 became a regent, and then crowned George I, who ascended the throne in the same year.

Ten Kate (*těn kǎ'te*) or KATE, JAN JACOB LODEWIJKTEN, poet and clergyman, born in The Hague, Holland, Dec. 23, 1819; died in Amsterdam, Dec. 24, 1889. He studied in his native city and was a student of theology (1838-43) at the Univ. of Utrecht. He later settled in Amsterdam, where he exercised an extensive influence as a pastor and a writer. Three of his most beautiful poems are "The Creation" (1866), "The Planets" (1869), and "The Seasons" (1871). He made many translations of other poets, including Dante, Schiller, Milton, and Byron. His poems were collected after his death in "Poetic Work" (12 vols., 1890-91).

Tennant (*těn'ant*), SMITHSON, chemist, born in Selby, England, Nov. 30, 1761; died in Boulogne, France, Feb. 22, 1815. He studied at Edinburgh and was graduated (1790) from Cambridge, where he later (1813) became professor of chemistry. His many experiments contributed valuable information to the field of chemistry. He proved (1796) by burning a diamond that it consists solely of carbon and announced (1804) his discovery of osmium and iridium (the latter is found in the solution of platinum ores). An arsenic compound of the mineral tetrahedrite was named, in his honor, tennantite.

Tennessee (*těn-q-sē'*), a river of the U.S., formed in eastern Tennessee by the junction, near Knoxville, of the Holston and French Broad rivers. Its course at first is toward the southwest, into northern Alabama, where it makes a bold turn toward the northwest and flows through Tennessee into Kentucky, entering the Ohio River at Paducah, Ky. Nine dams on the main stream of the Tennessee form a 9-ft. navigation channel 650 m. long, which is connected with the inland-waterway system. The river is 652 m. long and receives the Duck, Flint, Clinch, Elk, Little Tennessee, and Hiwassee rivers.

Tennessee, a state in the East South Central section of the U.S., home of the Tennessee Valley Authority and the atomic installation at

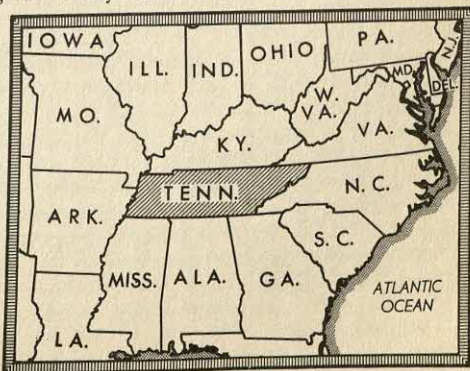


Oak Ridge. Mainly an agricultural state, producing livestock, cotton, corn, and tobacco, Tennessee manufactures textiles and chemicals and is an important producer of pyrites, phosphate rock, zinc, and marble.

Tennessee is bounded on the N. by Kentucky and Virginia; on the E. by North Carolina; on the S. by Mississippi, Alabama, and Georgia; and on the W. by Arkansas and Missouri. It ranks 34th in size among the states and 17th in population, according to the 1958 estimates of civilian population (Alaska, Hawaii, and the District of Columbia included in both rankings). The state's name comes from *Tenassee*, an ancient Cherokee capital, first mentioned (1730) by Sir Alexander Cumming, a Scottish traveler who established friendly relations with the Cherokee. The word has no known meaning. Tennessee's nickname, the "Volunteer State," was first used during the War of 1812 and refers to the large number of volunteers it supplied during that and subsequent wars.

GEOGRAPHY

Since it extends for more than 400 m. from east to west, the state of Tennessee possesses a great variety of surface features. The land rises



| | |
|------------------------------------|--|
| Location | Between 81°40' and 90°18' W. long. and 35° and 36°41' N. lat. |
| Area | 42,577 sq. m. |
| Land | 41,797 sq. m. |
| Inland water | 780 sq. m. |
| Greatest extent: | |
| North to south | 120 m. |
| East to west | 430 m. |
| Population (1950) | 3,291,718 |
| Capital city | Nashville |
| Highest point | Clingmans Dome (6,642 ft.) |
| Lowest point | Mississippi River (182 ft.) |
| Admitted to the Union (16th state) | 1796 |
| Song | "My Homeland, Tennessee," words by Nell G. Taylor, music by Roy L. Smith |
| Flower | Iris |
| Bird | Mockingbird |
| Motto | "Agriculture, Commerce" |
| Flag | See color plate in Vol. XI |

almost like a flight of steps from the Mississippi River, which forms the western boundary, to the Appalachian Mts., in the east. Western Tennessee, along the banks of the Mississippi River, is a flood plain with many marshes and lakes. Best known of these is Reelfoot Lake, in the northwestern corner of the state, a strikingly beautiful wilderness of water and trees. The section of lowest elevation in the state is also part of this plain and is located in the state's southwestern corner. The eastern part of the plain region is composed of loessal hills of fine, powdery loam deposited by centuries of wind erosion. A great deal of cotton is grown in this bottomland section. The river plain is about 100 m. wide; its low hills give way to a region of much steeper hills, averaging about 800 ft.; the western edge of this highland section is about 1,000 ft. high, the eastern edge, about 600 ft. In the center of the highlands is an oval basin, about 300 ft. to 400 ft. lower than the surrounding hills, and widest between its northern and southern edges. It contains fine land for beef and dairy cattle and for grain cultivation. The next level is called the Cumberland Plateau, about 1,800 ft. to 3,500 ft. high, a geographic province extending northeast from Alabama through Tennessee to Kentucky. Its western edge slopes gradually into the highlands, but the eastern edge ends in a sharp, 1,500-ft. drop to the Great Valley, a hollow between the Cumberland Plateau and the Great Smoky Mts. of the Appalachian chain. The floor of this valley, a fine farming area, is crossed by a number of parallel ridges with narrow valleys between them. The last step upward is the region called the Great Smoky Mts.; some of its peaks are among the highest in the eastern U.S., notably Clingmans Dome, on the North Carolina border, which rises to 6,642 ft. Heavily wooded and rich in minerals, this area's dramatic vistas also attract many tourists.

Tennessee's most important rivers are the Mississippi, the state's western boundary, and

the Tennessee and Cumberland rivers. The Tennessee, largest tributary of the Ohio River, rises in the mountains of southwestern Virginia, and flows southwest through the Great Valley of eastern Tennessee into Alabama, where it flows west, then north across Tennessee's western highlands into Kentucky's Ohio River. Once an unpredictable and destructive river, the Tennessee has been harnessed by the Tennessee Valley Authority's series of dams, which have checked its floods, making it navigable and furnishing vast quantities of electric power. More than 450,000 acres of Tennessee are covered by TVA reservoirs. Pickwick Landing, Watts Bar, Norris, and Chickamauga are some of the better-known TVA dams in Tennessee. The Cumberland River rises in Kentucky, flows southwest into Tennessee, westward, then north, crossing Kentucky and joining the Ohio River. The U.S. Corps of Engineers has constructed the Cheatham and Old Hickory dams on the Cumberland River, Dale Hollow Dam on the Obed, and Center Hill Dam on the Caney Fork, all of which have impounded large bodies of water. These dams, together with those of the TVA, have provided Tennessee with flood control and power, in addition to fishing and water sports. Partly because of the enormous power reserves of the TVA dams, Atomic Energy Commission plants and laboratories were built at Oak Ridge, in northeastern Tennessee.

Tennessee has many places of historic interest, among which is the Hermitage, home of President Andrew Jackson, near Nashville. The home and tailor shop of Andrew Johnson, Lincoln's successor in the Presidency, is preserved in a museum at Greeneville. Century-old log cabins, corncribs, and gristmills are common in the Great Smokies. Even a sturdy blockhouse survives at Benton. In northeastern Tennessee is the Cumberland Gap, the pass through which settlers poured to conquer the West. Not far from Chattanooga is Lookout Mt., rising 2,000 ft. above the city and famous as the site of the Civil War battle of Lookout Mt., also called the Battle Above the Clouds.

Climate: Western, or lowland, Tennessee's climate is much like that of the rest of the

ANNUAL STATE EVENTS

| | |
|--|---|
| National Field Trials for Bird Dogs | First week in February; Grand Junction |
| Cotton Carnival "Chucky Jack" | May; Memphis |
| Rhododendron Blooms | Summer months; Gatlinburg; historical play presented in outdoor theater |
| Tennessee Walking Horse National Celebration | July; Roan Mt.; beautiful specimens of rhododendron may be seen along mountain roads |
| State Fair | Last week in August; Shelbyville; celebrates renowned breed of riding and show horses |
| | Third week in September; Nashville |

TENNESSEE

South: long, hot summers with high humidity, and short, mild winters with occasional brief cold snaps. Eastern, or highland, Tennessee's climate is more like that of the northeastern U.S., with long winters, deep snowfalls, and cool summers. The sheltered valleys have less severe climate than the mountainsides. Rainfall is quite sufficient for farming; it is heaviest in December and January.

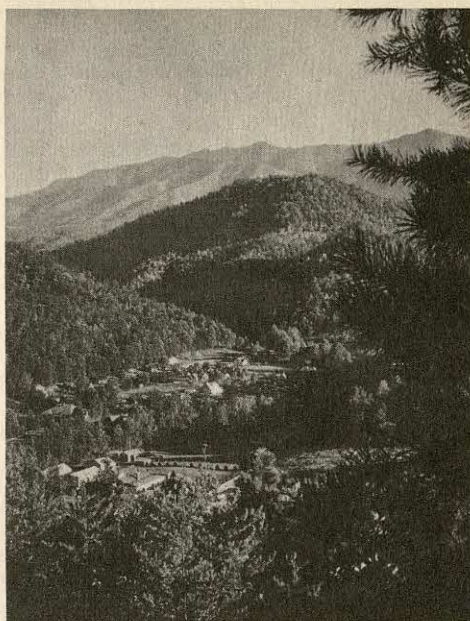
| | Memphis | Nashville |
|------------------------|-----------|-----------|
| Normal temperature | | |
| January | 41.9° F. | 39.9° F. |
| July | 81.3° F. | 80.0° F. |
| Annual mean | 62.4° F. | 60.1° F. |
| Latest frost | April 15 | April 19 |
| Earliest frost | Oct. 17 | Oct. 17 |
| Precipitation | | |
| January | 5.38 in. | 4.93 in. |
| July | 3.10 in. | 3.96 in. |
| Annual | 46.81 in. | 45.03 in. |
| Average growing season | 238 days | 214 days |

NATURAL RESOURCES

Tennessee contains a variety of valuable soils. The region adjacent to the Mississippi River contains silty soil deposited during floods; farther east is a plain of fine loess (wind-deposited soil). Both areas yield good cotton crops. Central Tennessee is a phosphate-and-limestone enriched grassland producing excellent pasture.

Tennessee ranks first among the states in output of pyrites, second in phosphate rock, and fourth in zinc. It also produces a fine white marble used in statues and public buildings. The state's coal reserves were estimated at 25,000,000 tons in 1956; other mineral resources include copper, silver, and manganese.

Forest lands amounted to 12,550,000 acres in 1953, and saw-timber volume was 993,000,000 bd. ft. in 1952. About 80 per cent of this timber



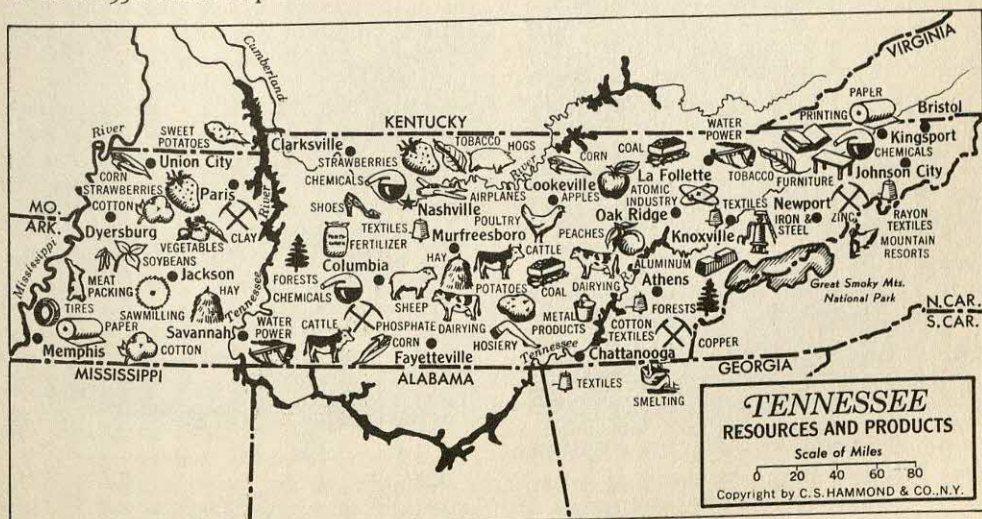
Courtesy Tennessee Conservation Dept.

GREAT SMOKY MTS. NATIONAL PARK

is such valuable hardwood as oak, chestnut, gumwood, and poplar. Softwoods include yellow pine, hemlock, and cypress.

Tennessee ranks fourth among the states in hydroelectric-power production. In 1956 more than 7,000,000,000 kw. hr. were generated by TVA dams, and steam generating stations raised the total power production to ca. 32,000,000,000 kw. hr.; this was utilized by large power-consuming industries such as those making nitrate fertilizers and explosives and refining aluminum, as well as by the Atomic Energy Commission's plants at Oak Ridge.

An active conservation program is being car-



ried out. Erosion and flooding in the Tennessee Valley necessitated Federal aid, which has succeeded in rehabilitating the area. In addition to dam and levee building, other conservation activities of Tennessee include terracing and the planting of cover crops, stocking streams with fish, reforestation, wildlife protection, and the creation of a system of 15 state parks.

TENNESSEE'S ECONOMY

Tennessee has traditionally been an agricultural state, the earlier plantation system being supplanted by tenant farming after the Civil War. In 1950 agriculture engaged the largest proportion (22 per cent) of the labor force. In 1954 there were 203,149 farms. Farm acreage totaled 17,654,000, with 86.9 acres the average per farm. The most valuable crops were cotton (1957 farm value, cotton and cottonseed, \$74,209,000), in production of which Tennessee ranked seventh among the states; tobacco (1957 farm value, \$66,848,000); and corn (1957 farm value, \$61,964,000). The 1957 cash income from crops, livestock, and government payments was \$460,046,000.

Although manufacturing employed 21 per cent of the working force, slightly less than agriculture, its product was of far greater value to the state's economy. The leading industrial activity of the state was in chemicals. In 1954 value added by manufacture of chemical products was \$454,064,000; food processing was next, with a value added of \$187,173,000; textile products were a close third, contributing \$141,062,000. Other important industries in Tennessee include the manufacture of apparel, refining of nonferrous metals (chiefly aluminum), furniture-making, printing and publishing, and the manufacture of rubber and plastic products and machinery. In 1956 the total value added by manufacture in Tennessee was \$1,986,000,000.

Wholesale and retail trade together form the third-largest employment sector, engaging 17 per cent of the labor force of 1,134,941 in 1950.

In 1957 Tennessee ranked 27th among the states in mineral production, which was valued at \$128,750,000 and represented less than 1 per cent of total U.S. production. Leading minerals in order of value were coal, cement, stone, and zinc.

TRANSPORTATION AND COMMUNICATION

Tennessee's inland waterways are very important to the state's commerce; its three principal rivers provide over 1,000 m. of navigable channels. The Mississippi River has been a trade artery since colonial times, and Memphis is its chief port. Dams built by the TVA have made the Tennessee River into a series of navigable lakes, its chief ports being Chattanooga and

Knoxville. Nashville, on the Cumberland River, is the state's second-largest port.

The first railroad to operate in the state was the LaGrange & Memphis R.R. (1842), now part of the Southern Ry. Other railroads include the Louisville & Nashville R.R., the Illinois Central R.R., the St. Louis-San Francisco Ry., and the Gulf, Mobile & Ohio R.R. Railroad mileage in 1956 was 3,424 m. In 1957 the state had 70,505 m. of roads, of which 65,602 were surfaced. All the principal cities have airfields. The state had 111 radio stations and 14 television stations in 1957. The first paper published in the state was the Knoxville *Gazette* (1791). Among today's leading papers are the Chattanooga *Times*, the Memphis *Commercial Appeal*, the Nashville *Tennessean*, and the Knoxville *News-Sentinel*.

POPULATION

Tennessee has 95 counties. The state's 1950 urban population comprised 44.1 per cent of the total population; the rural population, 55.9 per cent. Between 1940 and 1950, the urban population rose 23.1 per cent over that of 1940. The rural population rose 7.4 per cent. More than a fourth of the state's population lived in the urbanized areas of Memphis, Nashville, Chattanooga, and Knoxville. Tennessee's population was estimated at 3,469,000 on July 1, 1958. In 1950 white persons numbered 2,760,257; of these, 2,745,192 were native born and 15,065 were foreign born. Nonwhite persons totaled 531,461; out of this group, 530,603 were Negroes. Population density in 1950 averaged 78.8 per sq. m.

The major religious faith in 1950 was the Protestant; there was a small Roman Catholic group and a very small Jewish group. The predominant Protestant bodies were the Southern Baptist Convention; The Methodist Church; the Presbyterian Church in the U.S.; the Disciples of Christ, International Convention; and the Cumberland Presbyterian Church.

Chief Cities: Memphis, a Mississippi River port in southwestern Tennessee, is the state's largest city. In addition to its cotton trade, it is important for its manufactures of lumber and steel products.

Nashville, on the Cumberland River in north central Tennessee, is the capital city and second in size. It is an important railroad junction and a manufacturing center. Nashville has been called the "Athens of the South" because of its many schools and colleges, and much of its architecture shows Greek influence.

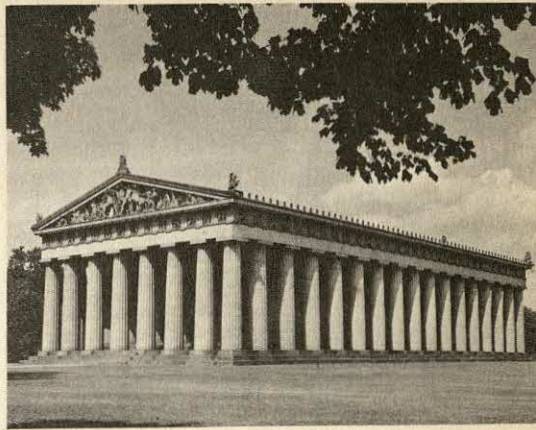
Chattanooga, on the Tennessee River in southeastern Tennessee, the state's third-largest city, is a railroad and manufacturing center.

Knoxville, on the Tennessee River in southeastern Tennessee, the fourth-largest city, is in



VIEW FROM LOOKOUT MT.

Chattanooga's key position on the Tennessee River made her the pawn of Union and Confederate forces



NASHVILLE'S PARTHENON

Replicas of Greek buildings and many educational institutions make Nashville the "Athens of the South"



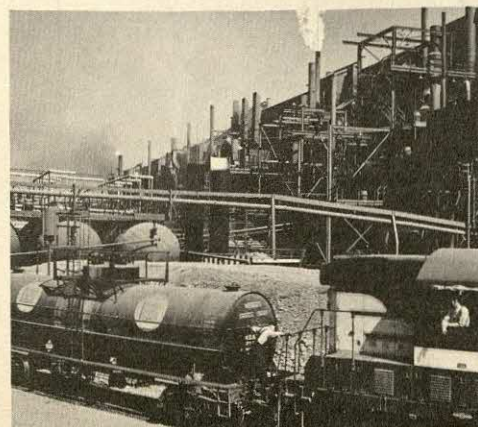
COPPER MINE AT DUCKTOWN

In the southeastern corner of the state, Ducktown is the site of large mining and smelting operations



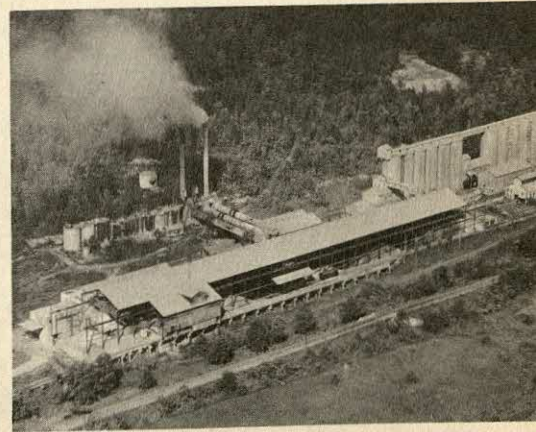
POTTERY MANUFACTURING AT ERWIN

Native clay is used for production of ceramics of various types (*courtesy Tenn. Conservation Dept.*)



CHEMICAL PLANT AT MONSANTO

A factory utilizing Tennessee's vast power resources (*courtesy Monsanto Chemical Co.*)



CEMENT-MAKING NEAR CHATTANOOGA

One of the city's wide variety of industries (*courtesy Tenn. Conservation Dept.*)



Courtesy Tennessee Conservation Dept.

VIEW OF MEMPHIS

An important Mississippi River port

the midst of a rich mining district. The TVA headquarters and the Univ. of Tennessee are located here. It was the state's first capital (1796-1812, and again 1817-19).

Famous Men and Women: Bell, John (1797-1869), U.S. Representative (1827-41); U.S. Senator (1847-59); Constitutional Union party Presidential nominee (1860), who unintentionally helped elect Abraham Lincoln by splitting the Southern vote.

Bradford, Roark (1896-1948), author of "Ol' Man Adam an' His Chillun," from which the play "The Green Pastures" was adapted.

Crockett, David (1786-1836), frontiersman, statesman, and hero of the Alamo.

Farragut, David Glasgow (1801-70), admiral, victor in the battle of Mobile Bay, August 1864.

Forrest, Nathan Bedford (1821-77), Confederate cavalry general, noted for his bold raids against Union strongholds.

Jackson, Andrew (1767-1845), South Carolina-born seventh President of the U.S. (1829-37).

Johnson, Andrew (1808-75), 17th President of the U.S. (1865-69).

Murfree, Mary Noailles (1850-1922), novelist who wrote about Tennesseans under the pen name of Charles E. Craddock.

Polk, James Knox (1795-1849), 11th President of the U.S. (1845-49).

Sevier, John (1745-1815), Virginia-born frontiersman, first governor of Tennessee (1796).

York, Alvin C. (1887-), a hero in the Argonne Forest campaign in World War I, who captured a German machine-gun nest and took 132 prisoners.

EDUCATION

Education is free and compulsory for children between the ages of seven and 17. The state's public-school system was established in 1854, but there was no statewide educational program before sometime after 1870, when a state department of education was established. Public-school enrollment totaled 763,500 in 1957. At the time of the 1954 Supreme Court decision regarding segregation, separate schools were maintained for white and Negro students. Leading state-supported institutions of higher learning include

TENNESSEE

the Univ. of Tennessee, Knoxville, with a branch at Memphis; and the Agricultural and Industrial State Teachers Coll. (traditionally attended by Negroes), Nashville. Private or denominational institutions of higher learning include Vanderbilt Univ., Peabody Coll. for Teachers, and Fisk Univ. (traditionally for Negroes), Nashville; and the Univ. of the South, Sewanee.

Among Tennessee's cultural institutions are the Atomic Energy Commission's museum at Oak Ridge, demonstrating the nature and applications of nuclear power; the Coll. of Music, Memphis; and the replica of the Parthenon containing casts of the Elgin Marbles and other Greek statuary, Nashville. Cumberland Home-steads, in Cumberland Mt. State Park near Crossville, has interesting demonstrations of various handicrafts by skilled mountaineer craftsmen. The State Museum is located in the War Memorial Bldg., Nashville.

GOVERNMENT

Tennessee is governed under provisions of a constitution dating from 1870 and amended in 1953 and 1959. The constitution gives executive authority to a governor, who is elected for a term of four years; a secretary of state, chosen by the state legislature for a four-year term; a controller and treasurer, each chosen by the legislature for a term of two years; and an adjutant general appointed by the governor. An attorney general and reporter, head of the state legal department and supreme court reporter, is elected by the supreme court for a term of eight years. The governor may not succeed himself until four years after the expiration of his term of office. The legislature consists of a senate of 33 members and a house of representatives of 99 members, both houses serving for two years. The legislature convenes in Nashville, the capital city, on the first Monday in January of the odd-numbered years. The session is limited to 75 calendar days. The supreme court consists of five members, two chosen at large, and three according to districts; all are elected for six-year terms. The court of civil appeals has nine judges serving eight years each. The judicial system also includes 20 circuit courts, 14 chancery courts, and various criminal, county, and justice-of-the-peace courts. Tennessee is represented in the U.S. Congress by two Senators and nine Representatives.

HISTORY

The earliest known residents of Tennessee were prehistoric Indians called Mound Builders. Many of their ritual and burial mounds still survive in the western section of the state. Later, the Indians of the Cherokee, Chickasaw, Choc-

taw, Creek, and Miami tribes considered the area their hunting ground. The first white man to set foot in Tennessee was probably the Spaniard Fernando de Soto, on his quest for gold in 1541. Father Jacques Marquette and Louis Joliet passed Tennessee on their exploration of the Mississippi in 1673, and in 1682 another French colonizer, René Robert Cavelier, Sieur de La Salle, started a trading post called Ft. Prud'homme (near modern Memphis) which failed in a few years. French Lick, another French post set up ten years later (near present-day Nashville), survived to become the first permanent white settlement in what is now Tennessee. The English entered the region in 1673, when a small party from Virginia explored eastern Tennessee. A century later the English had a thriving fur trade in the area, and the French had lost their holdings in the French and Indian War. At the end of the colonial period, the Tennessee country was claimed by North Carolina as part of its grant of 1665.

In 1760 Daniel Boone blazed a trail called the Wilderness Road, which opened to settlement the land beyond the Cumberland Gap in Kentucky and Tennessee. A group of North Carolinians called "the Regulators," who had staged an unsuccessful revolt against the colonial governor and British tax laws, settled along the Watauga River (1771). Thinking themselves outside the bounds of North Carolina, they established their own government, calling it the Watauga Assn. When the Revolutionary War came to North Carolina, about 500 of the

Watauga frontiersmen, led by John Sevier, helped defeat the British at Kings Mt. After the Revolution, North Carolina at first gave up the land beyond the mountains to the Federal government, but as the government did nothing to protect the region or establish law and order, Sevier organized the State of Franklin. North Carolina then changed its mind and claimed the region back. Sevier was arrested for treason, but escaped. Once again North Carolina yielded its claim, and in 1790 Congress organized Tennessee as a territory; it became a state in 1796, the first one to graduate from territorial status.

During the Civil War, Tennessee's loyalties were divided; it was the last of the Southern states to secede. Many Tennesseans, largely in the eastern part of the state, remained loyal to the Union, including Sen. Andrew Johnson, who refused to leave Congress when the other Southern Congressmen resigned. Although 115,000 Tennesseans fought under the Stars and Bars, another 30,000 fought under the Union flag. Union armies invaded the state but were bottled up in Chattanooga by the Confederate victory at Chickamauga. After a change of command, the North blasted its way out in the battles of Chattanooga and Lookout Mt. When the Union had reconquered Tennessee, President Lincoln appointed Andrew Johnson military governor of the state, until Johnson was elected Vice President in 1864. The state was readmitted to the Union in 1866. Although it was spared congressional Reconstruction, the postwar years were difficult politically and economically, and the

MAJOR RECREATIONAL AND HISTORIC FEATURES

| <i>Name and Type</i> | <i>Size and Location</i> | <i>Points of Interest</i> |
|---|--|---|
| Great Smoky Mts. National Park (established 1934) | 234,801 acres, in eastern Tennessee, near Gatlinburg; the remainder in North Carolina (U.S. 25, 70, 441) | Highest mountains in the eastern U.S.; bears; varied plant life; old cabins and buildings |
| Meriwether Lewis National Monument (established 1925) | 300 acres, in southwest central Tennessee, near Hohenwald (state 20, 48) | Meriwether Lewis, of the Lewis and Clark expedition, was murdered near here |
| Cumberland Gap National Historical Park (established 1955) | 2,027 acres, in northeastern Tennessee; the remainder in Kentucky and Virginia (U.S. 25) | Mountain pass, part of Daniel Boone's Wilderness Road to the West |
| Chickamauga and Chattanooga National Military Park (established 1890) | 8,190 acres, in the southeast, near Chattanooga (U.S. 41) | Scene of some of the fiercest struggles of the Civil War |
| Ft. Donelson National Military Park (established 1928) | 103 acres, in the northwest, near Dover (U.S. 79) | Civil War fortifications captured by Gen. Grant (1862) |
| Shiloh National Military Park (established 1894) | 3,615 acres, in the southwest, near Pittsburg Landing (state 128) | Site of the battle of Shiloh, which led to the fall of Vicksburg; Indian mounds |
| Cherokee National Forest (established 1920) | 1,204,102 acres, in the northeast, near Johnson City; the remainder in North Carolina (U.S. 19E, 19W, 25, 64, 421; state 67, 68, 70) | Rugged mountain country cut by gorges; wild bears imported from Germany may be hunted in season |
| Natchez Trace Parkway (established 1934) | 500-m. road running from Natchez, Miss., to Nashville, Tenn. | Old Indian Trail and pioneer road |
| Cumberland Mt. State Park (established 1937) | 11,215 acres, in east central Tennessee, near Crossville (state 8) | Mountaineers make pottery, woodwork, and other articles; mountain climbing; woodland trails |
| Shelby Forest State Park (established 1934) | 12,258 acres, near Memphis (off state 3) | Swimming; fishing; camping |
| Standing Stone State Park (established 1934) | 8,764 acres, in north central Tennessee, near Livingston (state 52) | Mountain scenery; lakes, streams, and waterfalls; hiking |

Ku-Klux Klan was founded (1865) in Tennessee.

The state attracted attention in 1925, when John T. Scopes was tried for teaching evolution in Dayton's public schools. He was defended by Clarence Darrow, among others, and was prosecuted by William Jennings Bryan.

During the depression years of the 1930's, the TVA turned a flood-scarred, barren, and eroded valley into a model of progress. A few years later the enormous electric-power reserve of the TVA dams was harnessed for the laboratories and workshops of Oak Ridge, where the scientists and mechanics of the "Manhattan Project" created the atomic bomb.

Tennessee furnished 89,925 residents to the armed forces in World War I, and 334,092 in World War II. In the postwar years, the state has continued to grow industrially, aided by a program designed to attract diversified industries to the small towns of Tennessee.

See also separate entries on most of the individuals and geographical and historical subjects mentioned in this article.

Tennessee, UNIVERSITY OF, a coeducational, state land-grant institution of higher learning at Knoxville, Tenn., founded in 1794, becoming the state university in 1879. It comprises col-

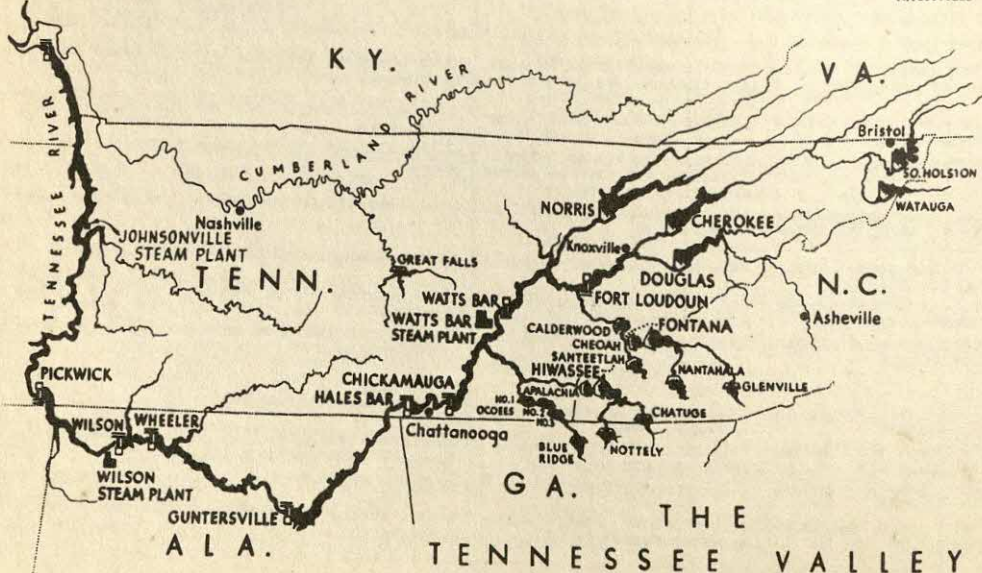
leges of agriculture, business administration, education, engineering, home economics, law, and liberal arts, a school of journalism, and a graduate school. At Memphis, Tenn., it has a campus comprising colleges of dentistry and medicine and schools of biological sciences, nursing, and pharmacy. It also offers programs in agriculture, education, home economics, and other fields, at Martin, Tenn. A school of social work is maintained at Nashville, Tenn. The library includes some 600,000 volumes. The annual fulltime student enrollment totals ca. 17,000, and the faculty has some 2,000 members. The physical plant is valued at more than \$65,000,000.

Tennessee Valley Authority or TVA, an independent corporate agency of the U.S. government, created by act of Congress on May 18, 1933. Congressional legislation creating the TVA specified that it was an act providing for the development of the resources of the Tennessee Valley region to achieve the maximum amount of flood control, the maximum development of the Tennessee River for navigation purposes, and the maximum generation of electric power consistent with flood control and navigation. The legislation also stated that the TVA was to promote agricultural and industrial development

TENNESSEE VALLEY AUTHORITY PROJECTS

Controlling and harnessing the Tennessee River

PROFILE OF THE TENNESSEE RIVER



and the reforestation of all lands suitable for reforestation. The policies set forth in the act are carried out by a board of three directors, who report directly to the President and Congress.

The region served by the TVA is 41,000 sq. m. and includes portions of seven southeastern states: Alabama, Georgia, Kentucky, Mississippi, North Carolina, Tennessee, and Virginia.

Development of the river is accomplished by 31 major dams, 20 built by TVA, 5 acquired by TVA, and 6 privately owned. Nine dams on the main stream form a 9-ft. navigation channel 650 m. long connected with the inland-waterway system. Since its completion in 1945, traffic had grown from 260,000,000 to 2,100,000,000 ton-miles in 1958.

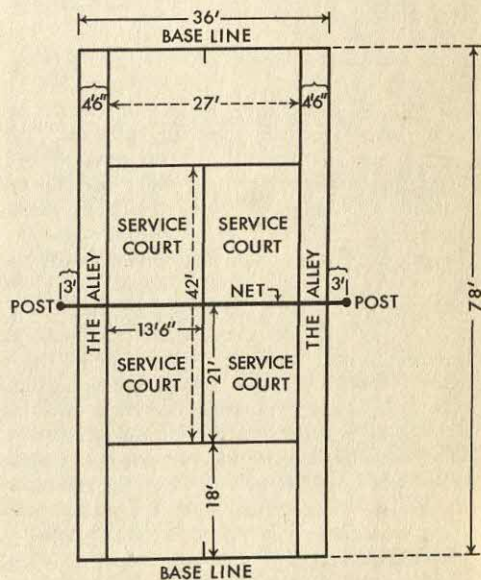
Ten large dams on tributary streams combine with the main-stream structures to form a flood-control system with nearly 12,000,000 acre-feet of storage. Damage averted from floods since 1936 on the lower Ohio, Mississippi, and Tennessee rivers amounted to ca. \$140,000,000. This included the second-greatest flood of record, in which the river level was lowered by 22 ft. at Chattanooga, sparing that city \$66,000,000 in damages.

Each dam contains power-generating units, and the flow of the water is interrupted 14 times for the generation of electricity on the river's course toward the Ohio River. The hydroelectric potential of the Tennessee was substantially developed soon after World War II, with the result that additional power for the service area had to be obtained through coal-burning steam plants. Expansion of the U.S. government atomic plants at the time of the Korean war required a marked enlargement of steam capacity. In 1959 TVA had eight large steam-electric stations. The power system's combined hydro-and-steam capacity on Jan. 1, 1959, was 10,600,000 kw. Generation in 1958 was 60,800,000,000 kw. hr., about half of which was used by atomic plants and other national-defense facilities. Power revenues in that year were \$233,500,000, producing a net income of \$55,000,000, or a return of 3.6 per cent on the average net investment of \$1,500,000,000.

World War I nitrate plants at Muscle Shoals, Ala., have been converted into a Fertilizer-Munitions Development Center conducting research to improve fertilizers and their manufacturing processes. Patents are made available to industry without royalty. Agricultural colleges in 36 states have cooperative arrangements with TVA to use its demonstration-fertilizer output for education among farmers in the most effective use of modern fertilizers. The forestry program stresses conservation both for watershed protection and for the development of the indus-

trial potential of timber through fire protection, reforestation, and improved management practices. Nearly 25,000 visitors from over 90 foreign countries have observed and studied TVA resource-development techniques.

Tennis (*tén'is*), a game played with a ball which is struck over a net with a racket. Tennis first reached popular acclaim in the 13th century, when it was played on indoor walled courts by French and English kings as well as monks. Perhaps for this reason, it became known as *court tennis*. Early players used the palm of the hand to strike a light cloth ball over the



TENNIS COURT LAYOUT

trial potential of timber through fire protection, reforestation, and improved management practices. Later, a glove, a paddle, and, finally, a racket were employed.

The modern version of the game, known as *lawn tennis*, was fathered by Maj. Walter C. Wingfield, a British army officer, who introduced it at a lawn party in Wales in 1873. The game reached the U.S. the following year by way of Bermuda, where it was watched by Mary Ewing Outerbridge. A resident of Staten Island, N.Y., she introduced it to members of the Staten Island Cricket Club. By the early 1880's, tennis had spread across the U.S. However, each area developed different rules for its local tennis groups, and much confusion resulted. The leaders of eastern clubs met in New York in 1881 to standardize game regulations and equipment. They became the founders of the U.S. Lawn Tennis Assn., which is still the ruling body of amateur tennis in the U.S.

Tennis is played on marked courts composed of a variety of surfaces. Grass, clay, asphalt, composition, and boards (for indoor use) are

all used. The court is 78 ft. long and 27 ft. wide for singles play, with one person on each side. For doubles play, with two persons on each side, an additional 9 ft. is added to the width of the playing area by including the side alleys. A net stretched across the center of the court is 3 ft. high in the center and $3\frac{1}{2}$ ft. high at the net posts. Tennis balls are hollow, made of rubber covered with felt, and have a diameter of $2\frac{1}{2}$ in. The rackets used in hitting the balls across the net usually weigh from 12 oz. to 14 oz. and are strung with lamb's gut, nylon, or silk.

To open a tennis game, the ball is put in play by a service (players flip a coin or racket to decide which side gets the service first). The server must stand behind the base line between the center and side of the court. He must hit the ball with his racket into the service court diagonally across the net from his position. The opening serve is made to the left service court, alternating between left and right for the remainder of the game, with the same server throughout. If the first serve does not cross over the net or lands outside the service court, the server may try again with a second ball. If he fails the second time, he loses the point (however, if the ball hits the net and dribbles over into the proper court, the serve can be made again). When the serve reaches the opponent's court, the opponent attempts to return it across the net by striking it with his racket before it hits the ground or after the first bounce. A point is lost when a player fails to return the ball across the net or when it goes outside his opponent's court boundaries. A point is gained when a player strikes the ball into the proper area and his opponent is unable to return it.

A game goes to the first side which scores four points, unless each side has scored three. In that case, one side must score two successive points to win the game. In scoring, the serving side's score is referred to first. Until a side has made a point, its score is called "love." The first point is 15, the second, 30, and the third, 40. In the case of 40-40, the tie is called deuce. When the serving side scores an additional point following deuce, it is called "advantage in." When the opponent scores the additional point, it is called "advantage out." A set is won when one side wins six games; but in the case of a five-five tie, one side must score two successive victories. A match victory goes to the side winning two of three, or three of five sets.

The first lawn-tennis championship match was played in 1877 at Wimbledon, England, which is still the focal point for British tennis. Top U.S. matches are played at Forest Hills, N.Y.

The annual international matches for the Davis Cup (*q.v.*) attract worldwide attention, and the Wightman Cup Match (between U.S.

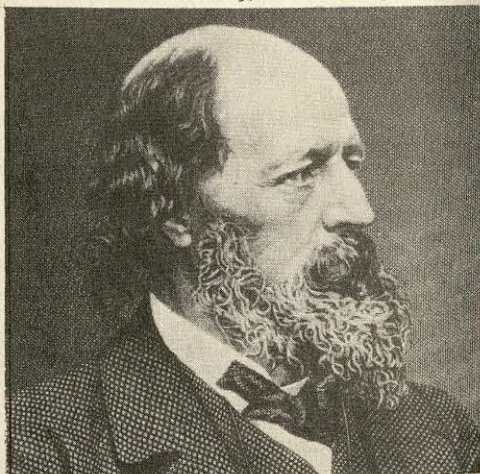
and British women's teams) is also a tennis highlight. The Australian and French championships are other important events in the tennis year.

William Tatem Tilden, Jr. (*q.v.*), is usually recognized as the top player in the history of the sport. Tilden, an American, won the U.S. men's singles seven times and the Wimbledon title three times. Other alltime greats include J. Donald Budge, H. Ellsworth Vines, Jr., John A. Kramer, and Maurice E. McLoughlin of the U.S.; René Lacoste and Henri Cochet of France; and, more recently, Richard A. Gonzales of the U.S. and Lewis Hoad of Australia. Among women players, Suzanne Lenglen of France and Mrs. Helen Wills Moody, Alice Marble, and Maureen Connelly of the U.S. have been outstanding.

Since the formation of the U.S. Professional Lawn Tennis Assn. in 1927, many leading amateur stars have joined the ranks of professionals. They include William Tilden, John Kramer, Robert Riggs, Richard Gonzales, and Lewis Hoad.

Tennyson (*tĕn't-sŭn*), ALFRED, LORD, poet, born in Somersby, Lincolnshire, England, Aug. 6, 1809; died near Haslemere, Surrey, Oct. 9, 1892; poet laureate of England from the death of Wordsworth, whom he succeeded in 1850, until his own death. After receiving a local education, Tennyson entered Trinity Coll., Cambridge, in 1828, remaining until 1831, when he left during his father's final illness.

Even as a young boy, Tennyson was a constant reader and a prolific writer. In 1827, when he was 18, he and his brother Charles published a volume called "Poems by Two Brothers." To this work his eldest brother, Frederick, also contributed a little. In 1829, at Cambridge, Tenny-



Courtesy British Information Services, N. Y.

ALFRED, LORD TENNYSON

son's poem, "Timbuctoo," was awarded the Chancellor's prize medal, and Tennyson's already considerable poetic reputation at the university was confirmed. His independent literary career may be said to have begun in 1830 with the publication of "Poems, Chiefly Lyrical." Another volume, "Poems," appeared in 1832. This included "The Lady of Shalott," "Oenone," "The Lotos-Eaters," and other poems that would have assured him a permanent place in English literature even if he had died in his 24th year. But it was the publication in 1842 of two volumes entitled "Poems by Alfred Tennyson" that established him among the leading poets of his day. From the death of Wordsworth until his own death, Tennyson was regarded by English readers as the foremost of living poets. Only Browning could rival him.

While at Cambridge, Tennyson formed a friendship with Arthur Henry Hallam, which became a very important influence in his life. Hallam, who was later engaged to Tennyson's sister, became his inseparable companion. Hallam's sudden death in 1833 led Tennyson into a period of extreme loneliness and depression. For years, until the two volumes of 1842, he published nothing, although he continued his work. During this period he began the "Idylls of the King," not completed until the publication of "Balin and Balan" in 1885. He also began his "In Memoriam," a record of his grief at the loss of Arthur Hallam composed over the period of years that had passed since Hallam's death.

In addition to the laureateship, Tennyson was honored by a degree of doctor of laws from Oxford Univ. (1855), and by his elevation to the peerage (1884) as Baron Tennyson of Aldworth and Farringford. He had twice refused to become a baronet and is said to have accepted the peerage reluctantly. Perhaps no English poet, with the possible exceptions of Scott and Byron, has been so widely read in his own day, and Tennyson's vogue continued much longer than theirs.

The extravagance of the praise accorded him in his lifetime and immediately after his death resulted in a reaction against Tennyson and his so-called Victorianism. His reputation is again rising, however, and he is sure of a high and permanent place among English lyric and narrative poets. No English poet surpasses him as a craftsman, in the precision of his language and the skill of his prosody. He does not have the intensity of Shelley, the violence of Byron, or the philosophic depth of Wordsworth, but his work has intensity and depth of thought and feeling of its own.

Tennyson published much besides the works mentioned above, including several plays on historical themes. Of these only "Becket" was successful, and it achieved success only after his death. Tennyson died at Aldworth, his home, in his 84th year and was

buried with great honor in Westminster Abbey.

Tennyson, HALLAM, BARON, author, born at Twickenham, England, Aug. 11, 1852; died Dec. 2, 1928. The eldest son Alfred Tennyson (*q.v.*) he received an early inclination toward literature. He attended Trinity Coll., Cambridge, and later studied law. In 1870 he published a prose translation of "Brunanburh," a song in Old English, subsequently turned into verse by his father. In 1897 he published the authorized biography of his father. He was appointed governor of South Australia (1890), and was later (1902-03) governor-general of the Australian Commonwealth.

Tenrec (*tĕn'rĕk*) or TENDRAC, a genus of mammals native to Madagascar. The tenrec, which somewhat resembles the hedgehog (*q.v.*), is nocturnal, and although its primary food is insects, it also feeds on worms and the tender roots of plants.

Tense (*tĕns*), in the grammar of any language, any of those forms of a verb expressing the time in which an action or state occurred.

Tensile Strength (*tĕn'sil strĕngth*), the ability of a sample of material to resist a direct pull. The tensile strength of a material is usually stated in terms of its ultimate stress, which is the maximum stress of which the material is capable without rupture. For ordinary low-carbon steel the tensile strength is about 60,000 pounds per sq. in., and for alloy steels it is much higher. Glass, concrete, and similar materials have low tensile strength, while silk fibers have extremely high tensile strength. See also *Elasticity*; *Stress*.

Tent (*tĕnt*), a dwelling or shelter made of canvas, or the skins of animals, stretched upon cords or a light frame, and supported by poles set in the ground. Tents are the chief habitations of nomadic tribes. The Israelites lived in tents for 40 years during their journey from Egypt to Palestine. The tents of the Saracens were not known to Europeans until the time of the Crusades. The modern tent is made of canvas and varies in height. A well-chosen tent can be made habitable in virtually any climate.

Tenure of Office (*tĕn'ūr of ōf'is*), the duration or term of an official position, as well as the manner of holding it. Several important acts relating to this subject have been passed by the Congress of the U.S., although these refer more particularly to positions filled by Presidential appointment with the consent of the Senate. Before 1820 no term of office was provided for any inferior officer, except U.S. marshals, but in that year a bill was passed providing that a large number of officials were to be appointed for terms of four years.

A bill which required that certain postmasters be appointed by the President for four years and confirmed by the Senate, subject to removal at the pleasure of the President, was passed in 1836. The

Ramspeck-O'Mahoney Postmaster Act of 1938 superseded the four-year term of office provision. Presidential postmasters appointed under this act receive appointments without term and hold office during good behavior.

The "spoils system," under which many office-holders are discharged when their own party goes out of power, was probably almost equally inaugurated by Jefferson and Jackson. In 1867 a rebellious Congress, allegedly to prevent abuses but actually to prevent President Johnson from interfering with its reconstruction program, passed the Tenure of Office Act. It provided that no officer subject to confirmation by the Senate should be removed without the consent of that body and that cabinet members should hold office throughout the term of the President appointing them unless the President had the Senate's consent to discharge them. Johnson, feeling that the measure was unconstitutional, removed his Secretary of War, who actually had been appointed by Lincoln and whose case, therefore, clearly failed to come under the law. Nevertheless, this removal was used as the basis of the impeachment of Johnson. The incidental effect of the Tenure of Office Act was to interfere with the operation of the "spoils system," but this was of slight importance for the next 20 years since the Republican party remained in office continuously. The act was practically repealed during Grant's administration and was altogether repealed during Cleveland's first administration (1887). Meanwhile, a Federal Civil Service Act had been passed (1883), guaranteeing those civil servants appointed under it against the abuses of the spoils system.

The power of a President to remove a government employee was twice tested again. President Wilson violated the act of July 12, 1876, which provided that first-class postmasters should be appointed for a four-year term and could not be removed during it without the consent of the Senate. The Supreme Court decided that the act was an unconstitutional invasion of executive authority. In 1933, President F. D. Roosevelt discharged a member of the Federal Trade Commission because they did not agree on policy. The Supreme Court decided that a President could not remove a member of what it called a quasi-legislative or quasi-judicial body except for a reason expressly stipulated in the law creating the body.

Teraphim (*tēr'ā-fīm*), in the Old Testament, a sort of images, never clearly defined, supposedly with oracular powers.

Teratology (*tēr-ā-tōl'ō-jī*), the study of serious malformations, unnatural forms, or notable deviations from the normal, especially in animal life and most particularly in human beings. The word is derived from the Greek word for mon-



Official Netherlands Photo

CURIOSITY. PAINTING BY GERARD TER BORCH

ster, the old medical word for any unnatural birth. This study has gained in importance since the discovery that atomic radiation may produce serious mutations in life forms.

Ter Borch (*tēr bōrk*) or TERBURG, GERARD, painter, born at Zwolle, Holland, in 1617; died at Deventer, Dec. 8, 1681. He received his first instruction from his artist father, and later studied in Amsterdam and Haarlem. Although his earliest pictures show some influence of Frans Hals (*q.v.*), he acquired, as he matured, a more finished style, in which his meticulous brushwork achieved remarkable rendering of textures and fabrics, *e.g.*, in "The Letter" and "Paternal Advice." From 1651 until his death, he excelled in genre painting and small portraits, always depicting the types and surroundings of the wealthy and cultured class of his countrymen. His travels included stays in London, where William III posed for several portraits, and in Rome. One of his best-known historical paintings depicts the Dutch-Spanish Peace Congress of Münster" (1648), an event which took place while Ter Borch was actually in Münster.

Terceira (*tēr-sā'ra*), one of the Azores (*q.v.*), the second largest island of the group, about 50 m. N.E. of Pico. The area is 163 sq. m. It has steep and rocky coasts and the surface is mountainous, the highest point reaching *ca.* 3,500 ft. The products include wheat, corn, wine, lumber, and livestock. Angra, on the southeastern coast, is the seat of local government. A large number of the inhabitants are of Portuguese origin. Population, *ca.* 49,000.

Teredo (*tē-rē'dō*), a mollusk of the genus *Teredo*. The common shipworm found in all

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oceans, it bores deeply into wood, such as wharves or wooden ships, causing great damage. The only protection is to cover the wood with sound metal, such as copper sheaths.

Terence (*tě'əns*). See *Terentius Afer*.

Terentius Afer (*tě-ən'shī-ūs äf'ēr*), **PUBLIUS** (known in English as **TERENCE**), Roman comic poet, born in Carthage, Africa, *ca.* 195 or 185 B.C.; died in 159 B.C. He was brought to Rome as a slave, and is first heard of as the slave of the senator, P. Terentius Lucanus, from whom he took one of his surnames. Because of his unusual mental gifts his master had him educated and then gave him his freedom. The aging poet Caecilius introduced him into a refined literary circle, which was devoted to the study of Greek culture and adherence to Greek models. Between 166 B.C. and 160 B.C., Terence produced six comedies based on plays of Menander, Apollodorus, and Diphilus, the best exponents of the New Comedy of Athens. These were "*Andria*" ("Maid of Andros"), "*Eunuchus*," "*Heauton-Timorumenos*" ("The Self-Tormentor"), "*Phormio*" (name of a parasite in the play), "*Hecyra*" ("The Mother-in-Law"), and "*Adelphoe*" ("The Brothers").

The comedies of Terence were greatly admired by the followers of the Greek school. The plays achieved notable success in their initial performances, even though they never enjoyed the acclaim granted those of Plautus (*q.v.*). Charges of plagiarism and *contaminatio* (the practice of combining parts of several plays in order to develop a more complicated plot and introduce more characters) were brought against Terence, who fully admitted and defended the customary and recognized practice of *contaminatio*. Terence left Rome to visit Greece about 160 B.C., and he never returned to Rome. He is thought to have been shipwrecked in the homeward journey, together with translations of 108 comedies by Menander.

Terence sought to reproduce the life and refined speech of cultured circles in Athens, and his plays are comedies of manners, written in the purest Latin. Although they lack some of the vigor of his Greek models, they are remarkable for their smooth, subtle plots, excellent character delineation, and great beauty of language, and have been imitated through the centuries. Cicero and Caesar both mention Terence. In the Renaissance period, Petrarch, Erasmus, and Melancthon (*qq.v.*) considered his comedies models of style. In France, Montaigne and Sainte-Beuve (*qq.v.*) greatly admired Terence. He was imitated by La Fontaine, Molière, Sir Richard Steele, David Garrick, and Thomas Shadwell (*qq.v.*).

Teresa (*tě-rě'sä*), or **THERESA**, SAINT, the name of two important saints of the Roman Catholic Church. The earlier, **ST. TERESA OF AVILA**, or **TERESA OF JESUS**, was born at Avila, Old Castile, Spain, March 28, 1515; died at Alba, Oct. 4, 1582. A Car-



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melite nun, she became a great mystic, a leader in the reform movement within the Church, and eventually one of the major saints. She entered her period of mystic communion about 1555, and in 1562 and after founded several convents in various Spanish cities. She also founded convents of friars, in collaboration with another noted mystic known now as St. John of the Cross. She is said to have been in all ways a remarkable woman, noted for practicality as well as mysticism. She wrote copiously concerning convent discipline and about her own religious experiences.

The later, **ST. TERESA OF LISIEUX**, known also as *Teresa of the Child Jesus* and the *Little Flower of Jesus*, was born in Alençon, France, Jan. 2, 1873; died at Lisieux, Sept. 30, 1897. Like her namesake, she was a Carmelite nun. She lived a short, simple, and holy life, dying young of tuberculosis. She is noted for having lived and taught the "Little Way"—that is, the way of attaining goodness in performing humble tasks. Despite the relative obscurity of her life, after her death many miracles were attributed to her, and, these being attested, she was canonized in 1925, a mere 28 years after her death. Lisieux has since become a major place of pilgrimage, and many churches and shrines have been dedicated to her.

Terhune (*tě-r'hūn'*), **ALBERT PAYSON**, writer, born in Newark, N.J., Dec. 21, 1872; died at Pompton Lakes, N.J., Feb. 18, 1942. Travels through Egypt and Syria preceded his service on the staff of the *New York Evening World* (1894-1916). He became a successful short-story and motion picture author. He is best known for his dog stories, such as "Lad: A Dog" (1919) and "The Way of a Dog" (1934).

Terhune, **MARY VIRGINIA HAWES**, best known

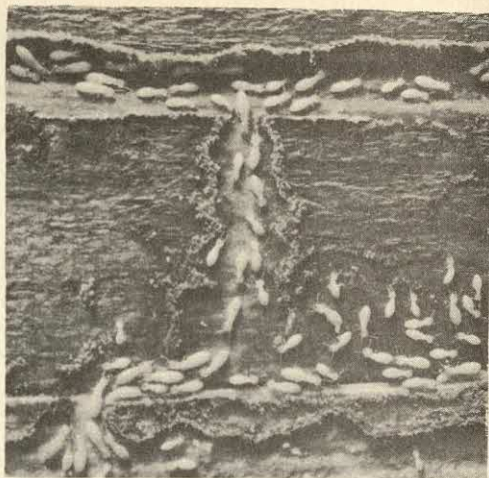
TERMITES

as MARION HARLAND, born in Amelia County, Virginia, Dec. 21, 1831; died June 3, 1922. She wrote for a weekly paper in Richmond at the age of 14 and later for many magazines. In 1856 she married E. P. Terhune, a minister, and moved to Massachusetts; Albert Payson Terhune (*q.v.*) was her son. She established a magazine called the *Home-Maker* (1888). A pioneer in the literature of home-making, she is now best remembered for "Marion Harland's Complete Cook-Book."

Termites (*tēr'mits*) or WHITE ANTS, a class of insects, of the order *Isoptera*, found chiefly in the tropics, but also in the warmer parts of the Temperate Zone. In their mode of life they resemble the true ants, but belong to a different order. Most species make their nests on the ground, but some build their dwellings among the branches of trees. Those making their nests on the ground construct them in the form of a cone, often 10 to 25 ft. high, and these are divided into apartments, such as galleries, magazines, and chambers. Five classes of termites dwell in a single cone: males, females, neuters, soldiers, and workers. Soldiers, neuters, and workers appear to be imperfectly developed females. The males and perfect females have four large wings, but the principal part of the community is made up of workers, which are wingless. Mature males and females swarm into the air shortly after reaching maturity, when they lose their wings and become the so-called kings and queens of future generations.

The queen has a greatly extended abdomen, which contains the eggs, which she drops promiscuously, to be carried by the workers into the different apartments. Other duties of the workers are to build the habitations, construct covered roads, minister to the wants of the young and the king and queen, and stimulate the exit of mature winged insects. The soldiers have large, square heads, with projecting mandibles, and their duty is to defend the community, which they do with singular courage. Termites feed largely on branches of trees and dry wood, which constitute their principal diet, but also on other vegetable forms. Their taste for dry wood makes them a formidable and costly menace to frame buildings. They are found in considerable numbers in western Africa and the warmer regions of America. In many places their conical dwellings are built in villagelike communities. The male has a painful, though harmless, bite. Ants and birds destroy large numbers of termites, and in some places they are prized as human food.

Tern (*tēr'n*), a genus of gull-like birds in which the bill is pointed and somewhat longer than the head. The wings are long, the tail is forked, and the plumage is chiefly white. The tern is smaller than most gulls, but is almost constantly on the wing, usually flying near the surface of the water in search of fish and other animal food. About



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15 species of tern are native to North America. Species of terns occur in Europe and Africa. Many of them are birds of passage and in the summer season reach high latitudes, in both the Northern and the Southern Hemisphere.

Terpenes (*tēr'pēnz*), naturally occurring hydrocarbons associated with other components in greater or less amounts to constitute volatile oils. The terpenes have the formula $C_{10}H_{16}$, represented most commonly by pinene, the chief component of turpentine. They are classed as open chain olefines, monocyclic, and complex cyclic compounds. The terpenes are the least valuable of the odoriferous constituents of volatile oils as a source of flavor or odor. Terpeneless oils are often prepared to increase the stability of the oils. The terpeneless oils are prepared by vacuum distillation to remove the terpenes at as low a temperature as possible. Among the derivatives of terpenes are camphor, menthol, and thymol. See also *Hydrocarbon*.

Terrace (*tēr'is*), in *geology*, the name applied to a level tract of land bordering on a body of water, but elevated some distance above the surface. Terraces are found on the borders of many rivers and lakes, and in many places occur near the ocean. They sometimes consist of a series of level tracts that rise above each other with the increase of the distance from the shore. The terraces that border rivers are explained by the action of the water at different periods. At an early date the streams were wider, when the flood plains were cut down, and successive terraces were formed as the channels narrowed and deepened from time to time, hence the older and higher elevations are removed farthest from the stream. Lake terraces may be traced to a shrinkage in the volume of the water, which is evidenced by the fact that they are usually well marked on several sides of the lake basin. Lake Champlain, the Great Lakes, and the sheets of water in the Great Basin



TERRACED VALLEY IN LEBANON

have terraces due to this cause. These tracts are usually fertile and suitable for cultivation, though there are exceptions in the arid regions.

In *agriculture*, a terrace is a space artificially leveled on a hillside, banked at the downhill side to prevent erosion, thus making arable land that would otherwise be useful only for grazing. Terracing, or the making of such terraces, has long been practiced in areas where arable land is at a premium, such as China, the Philippine Islands, and the Near East. It is also coming into increasing use in the U.S. as a means of soil conservation.

Terra Cotta (*tě'r-à kō'l-à*), an Italian term meaning baked clay. It is commonly applied to a species of hard pottery much used in statuary, vases, and building ornamentation. Terra cotta was employed by the ancients in the construction of figures and architectural ornamentations, and many well-preserved and artistically beautiful specimens have been recovered from the sites of ancient cities. Some of the finest specimens belong to the period about 450 B.C., and others to even earlier periods. Beautiful specimens have been exhumed from many ancient cities.

In the 15th century terra cotta was adapted in many parts of Europe to the most artistic and elaborate architectural purposes, as is still evidenced by the fine churches of St. Catherine, in Brandenburg; St. Stephen, in Tangermünde; and St. Maria, in Milan. It continued a popular material until the 18th century, and its use has been revived to a large extent within the past 25 years. Fine powdered silica and potter's clay constitute the principal ingredients of terra cotta as made at present. Many beautiful color effects are obtained, the most pleasing being a cream color and a rich red. It is possible to enamel or glaze terra cotta in white and colors, in a manner similar to tile glazing. See also *Chinaware*.

Terramycin (*tě'r-à-mī'sin*), a relatively non-toxic yellow antibiotic originally isolated from soil

by the laboratories of Charles Pfizer & Co., Inc., Brooklyn, N.Y. It is a product of *Streptomyces rimosus*, a species of funguslike microorganism, the actinomycete, and has in many cases proved effective against penicillin-resistant strains. Terramycin is effective against many of the Gram-negative and Gram-positive bacteria, spirochetes, rickettsiae, and a few viruses. It is especially used in the treatment of septic sore throat, several types of pneumonia, tonsillitis, whooping cough, bronchitis, bacillary infections (anthrax), urinary and non-chronic gonococcal infections, brucellosis, and typhus. See also *Bacteriology*; *Gram Method*.

Terrapin (*tě'r-à-pīn*). See *Tortoise*.

Terre Haute (*tě'r'g hōi*), a city, the county seat of Vigo County, Ind., on the Wabash River, 72 m. s.w. of Indianapolis. It is served by the Chicago, Milwaukee, St. Paul & Pacific, the Pennsylvania, and other railroads. Surrounded by an agricultural and mining country, the city is picturesquely located on an elevated plateau above the river. The points of interest include the courthouse, Indiana State Teachers Coll., the Rose Polytechnic Inst., St. Mary-of-the-Woods Coll. (for girls), Swope Art Gallery, and several parks. Terre Haute has a large trade in coal, grain, livestock, and merchandise. Among the manufactures are flour, hardware, machinery, farming implements, packed meat, railway cars, and clothing. Terre Haute was settled in 1816 and chartered as a city in 1833. Population, 1950, 64,214.

Terrell (*tě'r'el*), a city in Kaufman County, Tex., 30 m. E. of Dallas, on the Southern Pacific and the Texas & Pacific R.R.'s. The surrounding country produces grain, cotton, truck, and livestock. Among the articles manufactured are shoes, fans, stoves, mattresses, concrete and tile, cotton seed oil, and feed. It is the seat of the North Texas Hospital for the Insane. The place was settled in 1872 and incorporated in 1885. Population, 1940, 10,481; in 1950, 11,544.

Terrestrial Magnetism (*tě-rěs'trī-əl mǎg'-nē-tiz'm*). See *Magnetism, Terrestrial*.

Terrier (*tě'rī-ēr*), the name of a species of the domestic dog, which pursues rats, badgers, cats, and foxes by digging into the earth. The name is derived from French *terrier*, "a burrow." The *Scotch terrier* is a well-known breed and is distinguished by its dark eyes, prick ears, and rough-coated body. It is either black, reddish brown, or red and black, and weighs from 15 to 20 lbs. The *bull terrier* is a breed crossed with the bulldog and is especially noted for its infinite courage. A large dog with straight hair of a black-and-tan color is known as the *Welsh terrier*, and a yellow species with wire-hair is called the *Irish terrier*. The *Skye terrier*, a species of the Scotch terrier, is prized for its long, silky coat. Several breeds of these dogs are called *fox terrier* and are distinguished by their gay and lively disposition, black and tapering nose, and fox-shaped ears. Other breeds include the *Boston terrier* and the *Clydesdale*, the *Yorkshire*, and the *Maltese* terriers.

Territorialism (*tě'rī-tō'rī-əl-iz'm*), a legal term meaning that the religion of a government or ruler had to be also the religion of the subjects. Under this concept, the civil head of a territorial unit, from kingdom to county, could govern the church of that unit in all respects, even as to articles of faith. This legal concept became of greatest importance during the Reformation. "Cuius regio, eius religio" ("One's region means also his religion") was the principle adopted in the Peace of Augsburg (*q.v.*) in 1555. If men did not want to adhere to a specific religion, they were free to emigrate to another state of Europe, but they could not profess a religion which was not the state religion, although sometimes special tolerance edicts were promulgated. The U.S. Constitution of 1787 did not limit the individual states from promoting specific state religions; however, no such use has been made by the states.

Territorial Waters (*tě'rī-tō'rī-əl wāt'ērz*), in international law, the waters subject to a sovereign state as distinguished from the high seas. Territorial waters may be classed as: (1) waters lying within the state; (2) waters which form boundaries between states; (3) coastal waters. The legal position of the first two classes is settled and clearly definable. Waters lying within a particular state are subject only to the jurisdiction of that state. When, however, they provide communication between two portions of the high seas, such as the straits of the Dardanelles and the Bosphorus and the Suez and Panama Canals, the shipping sent through them is usually governed by treaties, although the principle of international law maintains that they are to be used by all nations for vessels not engaged in war. The Rhine, the Danube, the Amazon, and the St. Lawrence Rivers,

although mainly within the limits of one country, are governed by this same principle of international law. Jurisdiction over waters which are boundaries between two sovereign states is fixed by treaties; an imaginary line drawn through the center of such bodies of water limits the jurisdiction. In the U.S., each state regulates waters lying wholly within its borders, unless they form part of the interstate waterways system, in which case they are under Federal control as provided by the Constitution.

Formerly, under international law, the "three-mile zone" measured from the low-water mark and known as the *maritime belt*, was the limit of jurisdiction along the coasts of a sovereign state. The distance of 3 m. was the range of cannon shot. At a later time, various other limits of jurisdiction were claimed and acknowledged, but, with the advent of prohibition, the U.S. gave her prohibition enforcement officers the right to board, search, or seize suspected liquor-running vessels operating within an hour's run of the coast. The U.S. Tariff Act of 1922 specifically fixed the limit at 12 m. Arms of the sea which are not more than 10 m. wide are regarded as territorial waters.

In time of war, the question of territorial waters raises the whole issue of neutrality. As a measure of self-protection, nations desiring to maintain their neutrality insist that the waters within their jurisdiction shall remain free from all belligerent activity, and generally take steps to enforce international law in this respect. The Declaration of Panama, passed by the American Republics in September-October 1939, early in World War II, contained a provision governing territorial waters in the Western Hemisphere. See also *Neutrality*; *Riparian Rights*.

Territory (*tě'rī-tō-rī*), the term applied in various countries to certain portions of the public lands that are under the direct control of the national legislature, which have not been organized into a state or a province. The territorial form of government is usually maintained until the territory has developed sufficiently in wealth and population to entitle it to admission into the federation or union of states or provinces. In the U.S. the term is applied to portions of the national domain not set up as states. Before admission to the Union, Alaska and Hawaii were both territories. Guam, the Samoan Islands, the Virgin Islands, Midway, etc., although not admitted to statehood, are technically considered "possessions" rather than territories. Puerto Rico occupies an intermediate status. For their government, see separate articles. Canada, South American countries, and Australia administer territories much as does the U.S.

Terry (*tě'rī*), ALFRED HOWE, soldier, born in Hartford, Conn., Nov. 10, 1827; died in New Haven, Dec. 16, 1890. He studied law at Yale Univ.

and in 1849 was admitted to the bar. From 1854-60 he served as clerk of certain Connecticut courts, and during that period went to Europe to study military operations in the Crimea. He entered the U.S. military service at the beginning of the Civil War, was made brigadier general of volunteers in 1862, and took a prominent part in capturing Ft. Wagner. In 1865, he commanded jointly with Adm. Porter in the attack on Ft. Fisher, which was captured on Jan. 14 of that year, was made brigadier general, and received the thanks of Congress. He became major general in the regular army on Mar. 13, 1865, and later commanded the departments of Dakota and the South. In 1876, he had charge of an expedition against the Sioux Indians under Sitting Bull, whom he drove into Canada. In 1886, he succeeded Gen. Hancock as major general, and two years later retired from the army.

Terry, ELLEN ALICE, actress, born in Coventry, England, Feb. 27, 1848; died in Tenterden, Kent, July 21, 1928. Born of a theatrical family, she made her debut with Charles Kean (*q.v.*) on Apr. 28, 1856, at the Princess's Theater, Longacre, playing the role of *Mamillius* in Shakespeare's "A Winter's Tale." She remained with Kean during the fifties. In the early 60's, however, she played, successively, with the Royalty Theater Company, with J.H. Chute at the old Theater Royal, Bristol, and with E.A. Sothorn at the Haymarket, London. During this latter engagement, she was particularly popular in Shakespeare's "Much Ado About Nothing," and Sheridan's "The Rivals." After marrying the painter, George F. Watts, from whom she was later separated, she retired from the stage, and, except for occasional performances, did not appear again until 1874.

During the late seventies, Ellen Terry resumed her career with a new energy. After appearing in 1874 in Charles Reade's "Wandering Heir" and with Charles Wyndham at the Crystal Palace in Oliver Goldsmith's "She Stoops to Conquer," she found her greatest role in 1875 as *Portia* in "The Merchant of Venice," by Shakespeare. In 1878, at the Lyceum, she played Ophelia to Henry Irving's *Hamlet*, thus initiating a partnership which was to continue for 24 years. In 1879, she and Irving played in "The Merchant of Venice" for 250 nights, and it was in these same roles that they made their final appearance together, on July 14, 1903, at the Drury Lane.

During the first decade of the 20th century, Ellen Terry was the dominant personality of the British stage. In 1903, she managed the Imperial Theater, and also published "The Letters in Shakespeare's Plays." In 1905, under Charles Frohman, she appeared in Barrie's "Alice-Sit-by-the-Fire." Her jubilee was celebrated in 1906 with productions of two Shakespearean plays, "The Merry Wives of Windsor" and "A Winter's Tale."



ELLEN TERRY AS PORTIA

In 1907, under Frohman, she made the first of her many tours of the U.S. It was during the first tour that she married the American actor, James Carew (James Usselman) with whom she lived until 1910. In 1877 she had been married to the actor Charles C. Wardell, but they had separated in 1881.

In her latter years, her health and memory failing, she was unable to take part in formal theatrical productions. She toured the English-speaking world as a lecturer, however, made movies, and, in 1922, was awarded the degree of doctor of literature by the Univ. of St. Andrews. Her final stage appearance was at the Lyric Theater, Hammer-smith, in Walter de la Mare's "Crossings." Just as Ellen Terry was the foremost actress of her day, so her performances with Henry Irving marked the most brilliant period of the English stage in the latter half of the 19th century.

Tertiary Period (*tēr'shī-ēr-ī pēr'i-ūd*), the older of the two periods which make up the Cenozoic era; the younger is known as the Quaternary period. The Tertiary rocks are divided into five series which from oldest to youngest are: Paleocene, Eocene, Oligocene, Miocene, and Pliocene. During the Tertiary period striking changes took place in the physical appearance of the earth. The most spectacular events included mountain-building and volcanic activity. It was then that the Alps, Himalayas, the Coast Range of California and Oregon, and the Cascade Mts. of Washington were formed, and the Andes, Rocky Mts., and the island arcs of Asia took on their present form. Volcanic activity during the Tertiary was responsible for the great lava outpourings of the Columbia River region and the volcanic rocks of the Rocky Mts. The Tertiary was also a period of erosion and deposition; in the U.S. extensive deposits of marine sediments accumulated along the continental borders and river and lake sediments within the continental interior. Within the period many changes

in animal life took place. The great reptilian monsters of the preceding era were replaced by the mammals, a group which not only underwent a remarkable series of evolutionary changes but increased in variety and numbers. Included in the economic products of the Tertiary are oil, coal, phosphate, building stone, gold, silver, copper, lead, zinc, and quicksilver. See also *Geology*.

Tertullian (*tēr-tūl'i-an*), QUINTUS SEPTIMUS FLORENS, Latin writer, born at Carthage, in Africa, about 160; died about 230 A.D. He was the son of a Roman centurion and in middle age embraced the Christian religion. For some time he preached at Carthage, and later at Rome. In 202 he joined the Montanists (*q.v.*), who were particularly rigid in morals and looked upon earthly pleasures with contempt. His most noted work is an address to the Roman magistrates in defense of Christianity, entitled "The Apology." Among his books are "On the Dress of Women," "On the Proscription of Heretics," "On the Resurrection of the Body," "On the Flesh of Christ," and "Against the Gentiles." His thinking is characterized by the typical rigidities of the convert, mostly concerning morals and ethics. The richness of his thoughts is sometimes obscured by a rather fantastic diction and a rough style, quite contrary to the then usual elaborateness of Latin writing.

Tesla (*tēs'là*), NIKOLA, electrician and inventor, born at Smitjan, Lika, Austria-Hungary, July 9, 1856; died Jan. 7, 1943. After studying in the schools of his native country, he took a course in engineering at the Polytechnic School, Paris, and later became engineer of the Paris Edison station. He was employed for some time at the Edison Laboratory, near Orange, N.J., but later opened a research establishment of his own. Tesla made many valuable additions to the fund of knowledge

NIKOLA TESLA

Courtesy Brown Bros., N. Y.



in electrical science. He invented the rotary field motor in 1888, the multiphase system which was adapted to the 50,000 horsepower plant that transmits the hydroelectric power of Niagara Falls to Buffalo and other cities. In 1899, he built a research laboratory about 10 m. from Pike's Peak, Col., and soon announced that he had discovered how to confine electrical currents of a pressure of 50,000,000 volts and how to produce electrical movements up to 110,000 horsepower. He stated that his instruments had been affected at different times by feeble electrical disturbances not of solar or terrestrial origin, and expressed the belief that these disturbances were probably produced by instruments operated by inhabitants of Mars. Among his many inventions are dynamos, induction coils, arc and incandescent lamps, etc. In his later years he devoted his time principally to research in wireless telegraphy.

Testicles (*tēs'ī-k'ls*), or TESTES, anatomical and zoological terms for two glandular organs in the male which secrete semen, the fluid containing the reproductive cells.

Test Oath (*tēst ōth*), the oath formerly required under various acts of the Parliament of England, administered in connection with certain religious tests imposed upon persons who held public office. The first legislation of this kind was passed in the 17th century, and subsequent acts to secure the establishment of the Protestant faith were enacted at different times. Most important of these were the Corporation Act of 1661 and the Test Act of 1673. The former provided that all magistrates were to receive the communion according to the Church of England, after taking the oaths of allegiance and supremacy. This test further strengthened by the law of 1673, which made it obligatory upon those who passed the ordeal to renounce the doctrine that arms may be taken up against the king. After making numerous modifications, the statutes were repealed in 1828. A form of test by oaths was imposed in the U.S. after the Civil War, both by State and Federal legislation, but it was held to be unconstitutional.

Testosterone (*tēst-ō'stēr-ōn*). See *Puberty*.

Tetanus (*tēt'a-nūs*), or LOCKJAW, an infectious disease of animals and man caused by the action on the central nervous system of a toxin produced by the growth of the tetanus bacillus in deep, penetrating wounds, especially those in which there is much destruction of tissue. The presence of other bacteria in the wound favors the growth of the tetanus bacillus. This organism is common in the feces of horses and cattle, and so is frequently found in cultivated soils. The horse is the most susceptible animal, next the guinea pig, then the mouse. Sheep may be infected, and occasionally dogs. The spores of tetanus may live for months in the soil, and it is by these that the tetanus infections complicating the injuries of farmers and

wounds of soldiers on battlefields are commonly incurred. Tetanus has occurred following childbirth and abortions, and in the newborn from infections of the navel. It has occurred from insufficiently sterilized catgut and other supplies used in surgical operations, and occasionally following vaccinations and other hypodermic injections. After a wound is infected, a definite incubation period of from five to ten days usually follows before symptoms develop. The shorter the incubation period, as a rule, the more severe is the disease. Usually muscle spasm develops first in the muscles of the neck, jaw, and mouth, producing the characteristic "*risus sardonius*" distortion (lockjaw), and later the muscles of the trunk and back are affected. These muscle spasms are associated with violent pain and difficulty in breathing and swallowing, and death may ensue if immediate treatment is not effected. The best treatment is immediate injection of tetanus antitoxin (prepared from horse serum) at the time of occurrence of any wound in which the possibility of tetanus infection may be suspected. Large doses of tetanus serum are given in cases of fully developed infection. See also *Serum Therapy; Vaccination*.

Tetragrammaton (*tēt-rā-grām'ā-tōn*), a term of Greek origin, meaning "four signs," applied to the four letters JHVH (or IHVH, JHWH, YHVH, YHWH) which in Jewish scriptures mark the name of God (Yahweh, generally transliterated in English as Jehovah) but which are not permitted to be spoken. *Adonai* and *Elohim* are used in its stead.

Tetrazzini (*tēt-rāt-zē'nē*), LUISA, singer, born in Florence, Italy, June 8, 1871; died at Milan, Italy, April 28, 1940. Famous as a coloratura soprano, in London and in North and South America, she spent the later years of her life mostly in Italy. She wrote a book entitled "How to Sing" (1925).

Tetzel (*tēt'sel*), JOHANN, monk, preacher, and salesman of papal indulgences, born in Pirna or Leipzig, Germany, ca. 1460; died Aug. 11, 1519. After studying at the Univ. of Leipzig he entered the Dominican order, in 1489, probably at Leipzig. Friction in his own monastery caused him to move to the monastery in the Polish province of Glogau, of which he later (1505) became prior. At the instance of Cardinal Cajetan, he was appointed inquisitor-general of Poland and then inquisitor-general of Saxony. He gained wide renown as a preacher, becoming a dispenser of indulgences for cardinal-legate Raymond Peraudi.

He rose to great prominence as general sub-commissioner for indulgences under Archbishop Albrecht of Mainz. The latter had reached an agreement with Pope Leo X, allowing him to preach indulgences on condition that half of the offerings should be used for the construction of the basilica of St. Peter's in Rome. In support of this vast enterprise, Tetzel preached the indul-

gences through many provinces of Germany, even to the borders of those which forbade the practice. The increasing abuses of the indulgence missions encouraged Luther to post his famous 95 theses on the castle church door at Wittenberg (Oct. 31, 1517), thus precipitating a momentous battle involving fundamental doctrines of the Christian faith and the authority of the Church. It was to lead to the Reformation and the Catholic Reform. Tetzel, who was preaching in the near-by town of Jüterbog, and to whom the theses were specifically directed, drew up (January 1518) 106 theses in reply to Luther. He also burned Luther's theses, and shortly thereafter the students of Wittenberg burned 800 copies of Tetzel's theses. In reply to Luther's Sermon on Indulgences and Grace, he wrote his "*Vorlegung*." Devout Catholics who felt that Tetzel had damaged the Catholic doctrine of indulgences were aroused to violent action, and finally a papal legate, Karl von Miltitz, was sent from Rome to establish order and punish Tetzel. Fearful of the populace, Tetzel took refuge in a Dominican monastery and died a few months later.

Numerous historians have attempted to analyze Tetzel's views and his responsibility in the struggle. Such facts as are known do not corroborate the theory that Tetzel had serious moral faults or that he embezzled funds from the sale of indulgences. It seems certain that Luther's theses were directed at the whole practice of indulgences and to other abuses within the Church, and that he looked upon Tetzel as a mere instrument of Church designs. As to doctrine, it is thought that Tetzel conformed strictly to the papal bulls on indulgences for the living. In the matter of indulgences for the dead, however, he was accused of deviating from Church doctrine. Apparently, Tetzel sold plenary indulgences for the dead without exacting true contrition on the part of those contributing the gifts of money.

Teutoburg Forest (*toi'tō-bōorg fōr'ēt*), BATTLE OF, a historically decisive battle fought in this northeast German forest in A.D. 9. The effects of this contest upon the development of Europe are of marked importance. Determined to extend his influence into central Europe, Augustus Caesar sent three powerful legions to subjugate the Germanic tribes under Arminius. The defeat suffered by the Romans in this battle prevented them from expanding into Germany, and set the limit of the Roman empire at the Rhine River. By securing the independence of the Teutonic peoples from Roman influence, the Battle of Teutoburg Forest helped to foster the development of separate and hostile cultures in Europe.

Teutonic Knights (*tū-tōn'ik nīts*), a powerful military and religious order which originated at the time of the Crusades. It was founded by citizens of Bremen and Lubeck for the purpose of

aiding the soldiers who suffered during the siege of Acre, in 1190, and Frederick Barbarossa of Germany raised it to an order of knighthood. The grand master first dwelt at Jerusalem, but when Palestine fell into the hands of the Turks he moved to Venice, and later the headquarters were established in Germany. They shifted their efforts to the colonization of the Baltic regions lying northeast of Germany, spreading Christianity in what were later known as Prussia, Poland, etc. During the 15th century the order became very powerful and many eminent men of Europe, including Henry IV of England, fought under its banner. It continued less powerfully until 1809, when it was dissolved by Napoleon. The order was revived by the Emperor of Austria, in 1840, and it had a large membership in that country.

Teutons (*tū'tūnz*), a tribe of Germans which inhabited the regions near the Baltic Sea, east of the Elbe. In 103 B.C. the Teutons joined the Cimbri to invade Gaul, where they successively destroyed three Roman armies. They proceeded to invade Italy, but were defeated with great loss by Marius in 102 B.C., in the region occupied by the French department of Bouches-du-Rhône. The name Teuton was ultimately applied to the Germanic people of Europe and is now used to denote Germans, Dutch, Scandinavians, and those of Anglo-Saxon descent, as opposed to the Celts and Latins. The Teutonic languages include three groups: the Low German, High German, and Scandinavian. The Low German dialects include Gothic, Friesian, Flemish, Dutch, and English; the High German tongues embrace the Old High German of the 7th to the 11th century, the Middle High German of the 12th to the 15th century, and the Modern High German; and the Scandinavian languages include the Swedish, Icelandic, Norwegian, and Danish tongues.

Texarkana (*tēk-sār-kā'n'a*), a city on the boundary line of Arkansas and Texas, the county seat of Miller County, Arkansas, and situated partly in Bowie County, Texas. It is on the St. Louis Southwestern, the Kansas City Southern, the Texas & Pacific and other railroads. The city derives its name from its location straddling the borders of Texas and Arkansas. Although Texarkana forms one unit socially and economically, it is divided into two cities politically, Texarkana, Tex., and Texarkana, Ark., each with its independent mayor and municipal government. It is situated in an important agricultural and livestock area, and produces a wide variety of manufactures, including cotton goods, cottonseed oil, railroad cars, tobacco products, machinery, and farming implements. Most of Texarkana's business, however, is concerned with marketing and distribution. The Red River Arsenal, a permanent military installation, is the source of income for a large

part of its inhabitants. The city was founded in 1873, and a year later Texarkana, Tex., was incorporated. Texarkana, Ark., was incorporated in 1880. The census of 1950 credits a population of 15,875 (11,821 in 1940) to the portion in Arkansas and 24,753 (17,019 in 1940) to the portion in Texas.

Texas (*tēk'sqs*), a state in the West South Central section of the U.S., covering one-twelfth of the area of the mid-continental U.S. The nation's leading producer of oil, sulfur, cotton, cattle, and sheep, Texas is rich in natural resources. It is a land of great distances and areas. From east to west, the state measures a greater distance than that from New York City to Chicago. One of its ranches, the King Ranch, is larger in size than the state of Rhode Island.

Texas is bounded on the n. by New Mexico, Oklahoma, and Arkansas; on the e. by Oklahoma, Arkansas, Louisiana, and the Gulf of Mexico; on the s. by the Gulf of Mexico and Mexico; and on the w. by Mexico and New Mexico. It ranks second among the states in size and sixth in population, according to the 1958 estimates of civilian population (Alaska, Hawaii, and the District of Columbia included in both rankings). The state's name comes from the Caddo Indian word *Tejas*, meaning "friends" or "allies." The state's nickname, the "Lone Star State," refers to the flag with a single star which flew over Texas during its almost ten years as an independent republic.

Texas, hard won from the Mexicans in 1836 by men whose names are still familiar to Americans—Sam Houston, Davy Crockett, Stephen Austin, Jim Bowie—is unique among the states in having been a sovereign nation at the time of its admission to the Union. The only other state to have enjoyed such independence, Hawaii, had reverted to the status of territory before becoming a state. Until 1959, Texas also enjoyed the position of largest state in the Union, but with the admission of Alaska, Texas became second in size. It will be a long time, however, before its legends of "bigness" disappear.

GEOGRAPHY

Although Texas contains a great variety of surface features, including plains, deserts, hills, plateaus, and marshes, most of the state is a vast prairie. The state slopes generally upward from the Gulf coast toward the interior in a series of definable steps. The region along the Gulf of Mexico is similar to that region in the other Gulf coast states, a low, sandy plain extending in a belt about 50 m. to 300 m. in width. In places quite marshy, this plain is hot and humid, supporting such semitropical crops as rice, citrus fruits, and winter

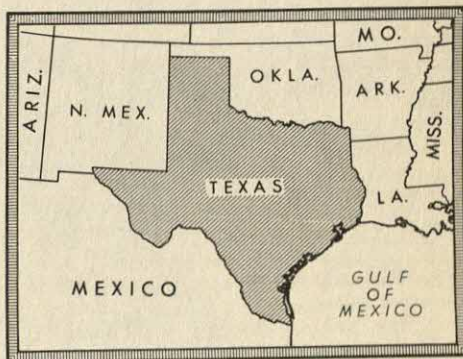


vegetables. In the northeastern part of the region is a valuable forest area running into Arkansas and Louisiana. Offshore, and paralleling the coast, is a line of long narrow islands, little more than sand bars. These tend to shelter the coast from hurricanes, which often lash the Gulf of Mexico, and to form bays or lagoons along the shore. Elevations run from sea level to about 500 ft. in this region.

The country of the northern Panhandle of Texas is part of the Great Plains region which stretches northward all the way to Canada. The Panhandle country is a vast grass-covered, treeless plain. In places the horizon is broken by flat-topped mountains or buttes, usually known as mesas in the Southwest. In other places the plain is cut by gullies, known in the Southwest as arroyos. There is little water; the wind sweeps ceaselessly over the land. Much wheat is grown here. Elevations run from about 700 ft. in the southeast to over 4,000 ft. in the west and north.

Central Texas is called the north central plain. In this section, which is rolling prairie land, is

found the most fertile soil of Texas. In the west, where the region becomes hilly, cattle are grazed. The eastern part of the plain, called the black prairie, is cotton-raising land. Elevations in this part of Texas run from about 600 ft. to 2,000 ft. The southern edge of the north central plain is a region known as the Edwards Plateau, which extends southward to the Rio Grande. To the west is another plateau, the Llano Estacado, or Staked Plain, so called, perhaps, for the stakelike stems of the yucca plants which dot its surface. This is a high, extremely dry desert region, which slopes upward to an elevation of about 4,000 ft. Southwestern Texas is called the Trans-Pecos section, after the Pecos River which separates it from the rest of the state. Also a desert, this region has the highest land in the state, in three ranges called the Guadalupe Mts., the single highest range; the Davis Mts., second in general elevation; and the Chisos Mts., third. Guadalupe Peak, in the west,



in the range of the same name, is the highest point in the state (8,751 ft.). In the Chisos Mts. is the imposing Santa Elena Canyon, cut by the Rio Grande to a depth of more than 1,500 ft.

Most of the rivers of Texas rise within the state and empty into the Gulf of Mexico. These include the Neches and its tributary the Angelina; the San Antonio and its tributary the Guadalupe; and the Brazos, Sabine, Trinity, Colorado, and Nueces rivers. The Rio Grande, which forms the Mexican border, and its tributary the Pecos River rise in the Rocky Mts. of Colorado and New Mexico, respectively, and flow into the Gulf of Mexico. The Red River, forming part of the Texas-Oklahoma border, flows eastward into the Mississippi. The Canadian River of northern Texas, which rises in Colorado, is a tributary of the Arkansas River.

Much remains of the feeling of colonial days in San Antonio, where a lovely river, whose banks are a continuous park, winds through the heart of town. Here is the Alamo, defended in 1836 by Davy Crockett and Jim Bowie; and nearby are several missions, the oldest San José Mission,

| | |
|------------------------------------|---|
| Location | Between 93°31' and 106°38' W. long. and 25°51' and 36°30' N. lat. |
| Area | 267,339 sq. m. |
| Land | 263,513 sq. m. |
| Inland water | 3,826 sq. m. |
| Greatest extent: | |
| North to south | 800 m. |
| East to west | 770 m. |
| Population (1950) | 7,711,194 |
| Capital city | Austin |
| Highest point | Guadalupe Peak (8,751 ft.) |
| Lowest point | Sea level (Gulf of Mexico) |
| Admitted to the Union (28th state) | 1845 |
| Song | "Texas, Our Texas," words by Gladys Y. Wright and William B. Marsh, music by William B. Marsh |
| Flower | Bluebonnet |
| Bird | Mockingbird |
| Motto | "Friendship" |
| Flag | See color plate in Vol. XI |

TEXAS

dating to 1720. At Galveston are an enormous jetty and sea wall, built to protect the city from a repetition of the storm and tidal wave of 1900. Huntsville preserves the home and law offices of Texas' great hero, Sam Houston, first president of the Texas Republic. Houston, 50 m. from the sea, is made an ocean port by the Houston Ship Canal, or Channel, which makes possible the loading of ships much closer to the oil fields of eastern Texas. The sight of large freighters and tankers apparently crossing the prairie is unforgettable. The King Ranch, world's largest cattle ranch, is located near Kingville, and is well over 1,000,000 acres in extent; it includes within its limits several towns housing the ranch hands and their families.

Climate: Because of its huge area and great expanse from north to south, Texas has a variety of climates. Northern Texas has a typical continental climate with short hot summers and long harsh winters. The Gulf coast and lower Rio Grande Valley are semitropical, with long humid summers and mild winters. Rainfall in western Texas is light. The months of greatest rainfall in central and eastern Texas are April, May, and June.

| | Amarillo | Brownsville | Galveston |
|-------------------------|-----------|-------------|-----------|
| Normal temperature | | | |
| January | 33.1° F. | 59.8° F. | 53.8° F. |
| July | 95.9° F. | 83.6° F. | 83.4° F. |
| Annual mean | 54.6° F. | 73.1° F. | 69.5° F. |
| latest frost, average | April 11 | Jan. 30 | Jan. 21 |
| earliest frost, average | Nov. 2 | Dec. 26 | Dec. 28 |
| Normal precipitation | | | |
| January | 0.51 in. | 1.81 in. | 3.41 in. |
| July | 2.84 in. | 2.27 in. | 3.71 in. |
| Annual | 21.01 in. | 31.05 in. | 44.87 in. |
| Average growing season | 205 days | 330 days | 341 days |

NATURAL RESOURCES

Texas contains topsoils of such great variety, and climate patterns of so many kinds, that an almost unlimited number of agricultural products can be grown in the various regions of the state. Cotton thrives in the river valleys of east and central Texas; and along the coast, rice and citrus fruits are grown. Central and northern Texas support great stands of wheat, while much of western Texas is grazing land, a sea of grass where countless cattle roam.

Perhaps the greatest treasure of Texas is its mineral wealth. Since the early 1900's, an enormous flow of oil has poured from fields in several different locations in the state, stretching roughly in a band that parallels the Gulf coast. The proved reserve of petroleum in 1957 was 14,550,000,000 bbl., the largest in the U.S. Sometimes found in the same fields, and sometimes separately, is natural gas, the reserve of which was estimated in 1956 to be 112,750,000,000 cu. ft., again the largest in the nation. In the vicinity of

TEXAS

Amarillo is located the world's largest supply of helium gas. Texas also has, near the Gulf coast, the largest U.S. deposit of sulfur. From the ocean, near Galveston, factories recover magnesium from sea water. Other important minerals of Texas include lignite, mercury, salt, silver, coal, clay, asphalt, iron, and gypsum.

Forests, mostly in eastern Texas, covered 37,700,000 acres in 1953. Commercially valuable trees found in Texas include the softwoods pine and cypress and the hardwoods ash, oak, gumwood, and hickory. The fisheries of Texas bring in such shellfish as shrimp, crab, and oyster, and finned fish such as red snapper, mackerel, pompano, and mullet.

Conservation activities in Texas take several forms. Gullies are packed with brush to slow the rush of water, while windbreaks of trees and re-planting of prairie grass keep the wind from carrying off the topsoil. Methods of obtaining oil and natural gas, once very wasteful and reckless, are now closely watched by a state commission. Other conservation activities include the stocking of streams with fish for sportsmen and the regulation of hunting.

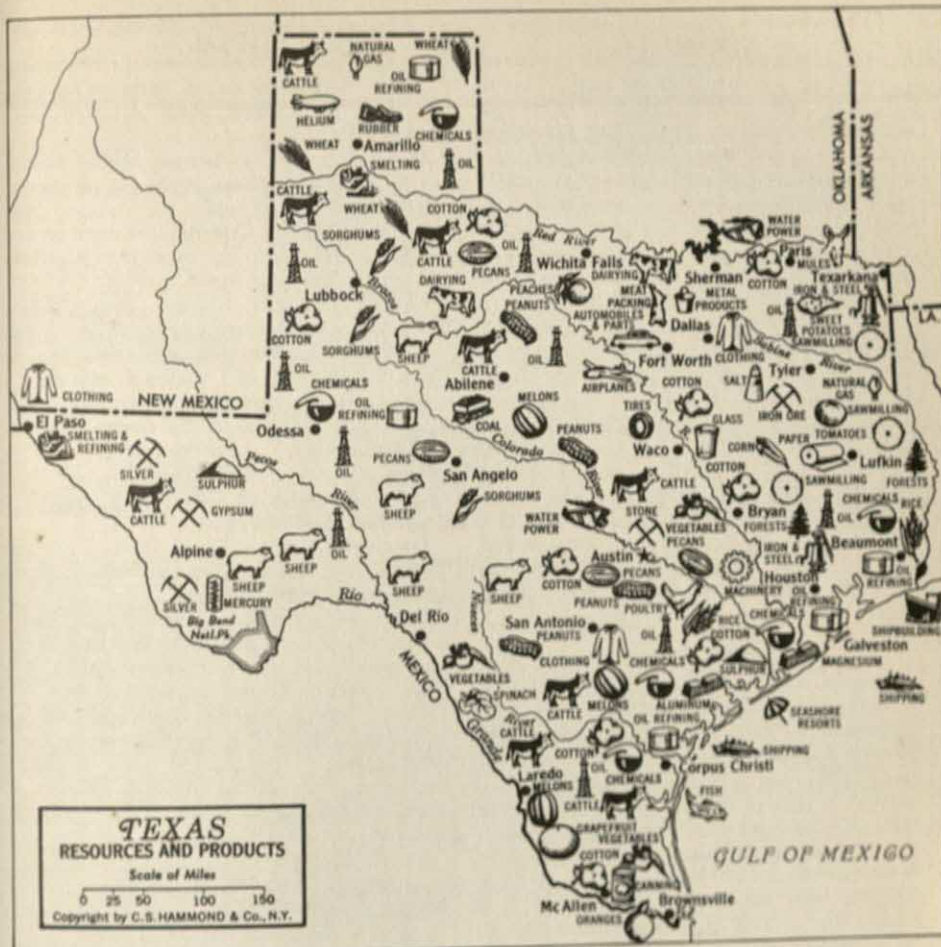
THE ECONOMY

Agriculture employs more people in Texas than manufacturing, although the value of manufactured products greatly exceeds that of farm products. In 1950 over 16 per cent of the state's workers were engaged in agriculture, while 14 per cent were employed in some form of manufacturing. The greatest proportion of the labor force, however—21 per cent—was engaged in wholesale and retail trade.

In 1954 there were 292,947 farms in Texas, covering 145,813,000 acres and averaging 497.7 acres in size. Cotton is the leading crop, Texas ranking first among the states in this product. In 1957, 5,905,000 acres of cotton were harvested, yielding 3,632,000 bales of cotton fiber and 1,550,000 tons of cottonseed, with a total farm value of \$565,636,000. Next in importance was grain sorghums (1957 farm value, \$230,952,000). Other large crops included wheat, corn, rice, and pecans. Livestock raising is another important farm activity in Texas. Texas has more cattle and sheep

ANNUAL STATE EVENTS

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|--|---|
| Texas Week | Week of March 2; statewide; Texas Independence Day, Sam Houston Day, and Texas Flag Day are celebrated on March 2 |
| Southwestern Exposition and Fat Stock Show | Nine days, beginning the second Friday in March; Ft. Worth |
| Fiesta de San Jacinto | Week of April 21; San Antonio |
| Cowboy Reunion | Three days in July; Stamford |
| Texas Pioneers Day | Aug. 12; statewide |
| State Fair | October; Dallas; largest state fair in the U.S. |



than any other state. In 1956 cash receipts from sales of cattle, calves, beef, and veal totaled \$424,325,000. In 1957 cattle of all types numbered 7,736,000 head. Sheep and lambs numbered 4,864,000. Wool production in 1956 was 42,653,000 lb., valued at \$18,767,000. The 1957 cash income from crops, livestock, and government payments was \$2,027,552,000.

The largest industry of Texas is the chemical industry. In 1954 the enterprise had a value added by manufacture of \$722,056,000. Next in size is the processing of foodstuffs (especially meat products) with a value added by manufacture of \$533,060,000 in the same year. In 1954 the value added by the refining of petroleum was \$452,750,000, and manufacture of oil-field machinery accounted for \$185,000,000. The manufacture of aircraft and parts accounted for \$270,000,000. Other large enterprises included the refining of metals; the making of stone, clay, and glass products; printing and publishing; and the fabrication of metal products. Total value added by manufacture in 1956 was \$4,600,000,000. The total labor force in 1950 was 2,757,829.

Texas ranks first among the states in value of mineral products. The total worth of all minerals produced in 1956 was \$4,211,000,000. Principal minerals in order of value are petroleum, of which 1,083,000,000 bbl. were produced in 1957; natural gas, the 1956 production being 5,000,000,000 cu. ft.; natural gas liquids, 6,700,000,000 gal. of which were produced in 1956; and sulfur. Texas leads the nation in the production of every one of these mineral products and produces 24.81 per cent of total U.S. production, ranking first among the states. The 1952 cut of saw-timber in Texas was 1,585,000,000 bd. ft., 1,161,000,000 bd. ft. of it made up of softwoods.

TRANSPORTATION AND COMMUNICATION

The Galveston District of the Gulf Intracoastal Waterway extends just inside the Texas coast line from the Sabine River 3 m. below Orange to Brownsville, a distance of about 421 m. Linking a series of lagoons along the Gulf shore, it connects Galveston with the Mississippi River. Thus, bulky cargoes can be sent cheaply as far as the ports on the upper Ohio River. Another impor-

tant waterway connects Houston with the sea, over 50 m. away. The state's chief ports are Houston, Port Arthur, Texas City, Galveston, Corpus Christi, and Beaumont. Inland, Texas depends heavily on rail and highway transportation. The first railroad in Texas was the Buffalo Bayou, Brazos & Colorado Ry., established Aug. 1, 1853, now part of the Southern Pacific R.R. Other railroads include the Missouri-Kansas-Texas R.R., the Missouri Pacific R.R., the Santa Fe Ry., and the Denver & Rio Grande Western R.R. Railroad mileage in 1956 totaled 15,337 m. In 1957 there were 228,154 m. of roads in Texas, a greater mileage than that of any other state. Of this total, 136,509 m. were surfaced. All the major cities have airfields. In 1957 Texas had 260 radio stations and 51 television stations. One of the earliest newspapers in Texas was the *San Felipe Texas Gazette* (1829). Among today's leading newspapers are the *Houston Chronicle and Post*, the *Dallas News and Times-Herald*, the *Ft. Worth Star-Telegram*, and the *San Antonio Light*.

POPULATION

Texas has 254 counties. The state's 1950 urban population comprised 62.7 per cent of the total population; the rural population, 37.3 per cent. Between 1940 and 1950, the urban population rose 58.4 per cent over that of 1940. The rural population declined (for the first time in state history) by 11.6 per cent. The state's population was estimated at 9,377,000 on July 1, 1958. In 1950 white persons numbered 6,726,534. Of these, 6,449,889 were native born and 176,645 were foreign born. Nonwhite persons totaled 984,660; out of this group, 977,458 were Negroes, with the remainder including Indians, Chinese, Japanese, and others. Population density in 1950 averaged 59.9 per sq. m.

The major religious faiths, in order of size, in 1950 were the Protestant and the Roman Catholic, with a small Jewish group. The predominant Protestant bodies were the Southern Baptist Convention; The Methodist Church; the Disciples of Christ, International Convention; the Protestant Episcopal Church; the Presbyterian Church in the U.S., the Assemblies of God, and the American Lutheran Church.

Chief Cities: Houston, near the Gulf coast at the head of the Houston Ship Canal, is the largest city, a manufacturing center and leading port.

Dallas, on the Trinity River in north central Texas, is the second-largest city in the state, a cotton center, and an outstanding financial, manufacturing, and commercial city as well.

San Antonio, on the San Antonio River in south central Texas, is third in size. It is prominent in manufacturing and is a shipping point for cotton, farm produce, and oil.

Austin, in southeast central Texas on the Colorado River, is the state capital and a manufacturing center.

El Paso, on the Rio Grande in the extreme western corner of Texas, is the largest port of entry on the Mexican border.

Ft. Worth, on the Trinity River in north central Texas, is a market for the surrounding cattle and wheat-producing region.

Famous Men and Women: Austin, Moses (1761-1821), and his son, Stephen Fuller Austin (1793-1836), frontier colonizers who brought about the settlement of Texas by Americans.

Bowie, James (1799-1836), Georgia-born frontiersman and inventor of the Bowie knife; he died in the defense of the Alamo.

Chennault, Claire Lee (1891-1958), Air Force officer, commander of the "Flying Tigers" in China during World War II.

Eisenhower, Dwight David (1890-), 34th President of the U.S.; born in Denison, Texas, he passed his youth in Kansas.

Hobby, Oveta Culp (1905-), journalist, commander of the Women's Army Corps (WAC) in World War II and first Secretary of the U.S. Dept. of Health, Education, and Welfare.

House, Edward Mandell (1858-1938), known as "Colonel" House, President Woodrow Wilson's close adviser.

Houston, Samuel (1793-1863), known as "Sam," Virginia-born frontiersman, hero of the Texas War of Independence, and president of the Texas Republic.

Johnson, Lyndon Baines (1908-), U.S. Senator (1949-), who became a member of Congress in 1937 and the Democratic leader in the Senate in 1953.

Maverick, Samuel A. (1803-70), lawyer, politician, and rancher, who did not brand his own calves and whose name is now used to designate all unmarked cattle or "mavericks."

Nimitz, Chester W. (1885-), naval officer who commanded the U.S. sea forces in the Pacific during World War II.

Rayburn, Samuel Taliaferro (1882-), called "Sam," Tennessee-born Representative from Texas who has been Speaker of the House for a longer time than any previous man (1940-).

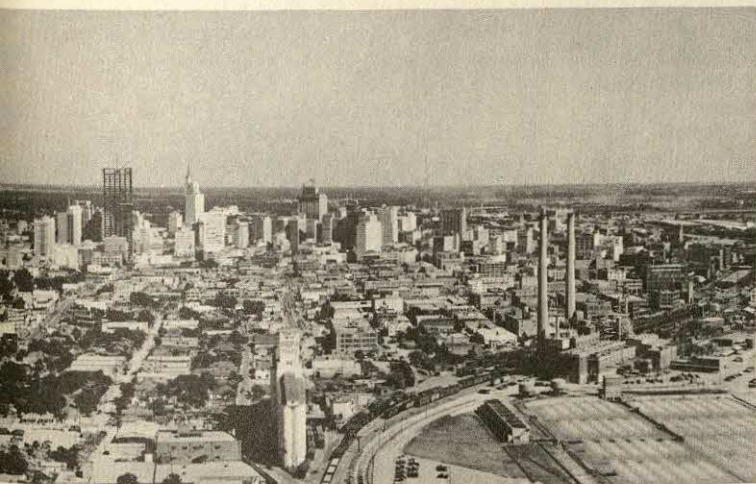
Travis, William Barrett (1809-36), South Carolina-born military hero who commanded the Texan force at the Alamo (1836).

EDUCATION

Education is free and compulsory for children between the ages of seven and 16. The state's public-school system was established in 1854. Public-school enrollment totaled 1,885,000 in 1957. At the time of the Supreme Court decision regarding desegregation, separate schools were maintained for white and Negro pupils. The

STATE ORIGINS

A tablet at Ysleta (right) commemorates the first Spanish mission in Texas, founded ca. 1682 to serve Spanish and Indian refugees from the Pueblo revolt in New Mexico. The present church faithfully reproduces the original. The monument at Austin (far right) honors the heroes whose last-ditch defense of the Alamo cost them their lives but united the Texan revolutionaries against Mexican forces (courtesy Ewing Galloway, N.Y.)

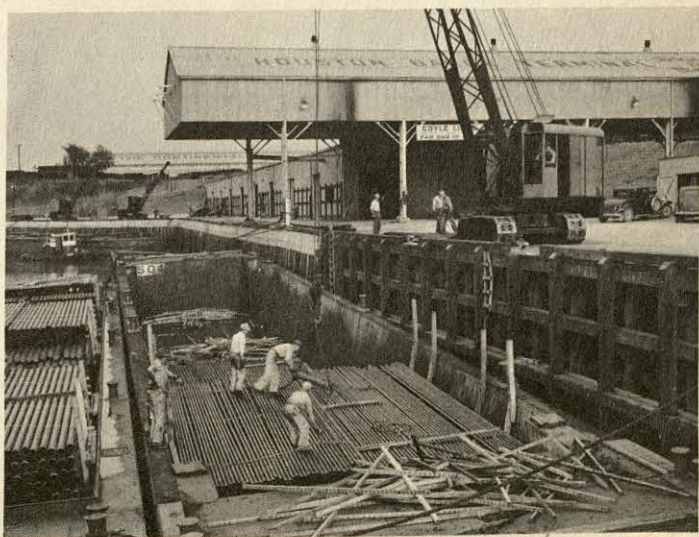


DALLAS SKYLINE

Dallas is among America's chief cities, with cultural and commercial connections extending throughout the Southwest. Cotton accounted for its original wealth but today's industrial and commercial interests typify the continuous broadening of the economic base of Texas. In addition, the citizens do much to foster artistic and educational development (courtesy Dallas Chamber of Commerce)

HOUSTON DOCK

Named for Texas' first president, Sam Houston, the city has become the state's largest city, and, since the building of a ship canal connecting it with the Gulf of Mexico (1914), a leading U.S. deep-water port. Gulf coast oil fields have contributed to its expansion and brought about the construction of huge refineries. Steel, chemical, meat packing, papermaking, and textile industries, as well as flour and rice milling, printing, and publishing show the enormous diversity of the state's economy. Rice Inst. and the Univ. of Houston are educational institutions of national significance (photo Ewing Galloway, N.Y.)



leading publicly supported institutions of higher learning are the Univ. of Texas, Austin, with medical schools in Galveston and Dallas; and a branch college, Texas Western Coll., at El Paso; and Texas Agricultural and Mechanical Coll., College Station. Prairie View Agricultural and Mechanical Coll., a branch of Texas A. & M., is a Negro college, as is Houston-Tillotson Coll., Austin. The state also maintains Texas Women's Univ., Denton; and state teachers colleges at Alpine, Canyon, Commerce, Denton, Huntsville, Nacogdoches, and San Marcos. Among the outstanding private and denominational institutions of higher learning are Baylor Univ., Waco; Rice Inst., Houston; Texas Christian Univ., Ft. Worth; and Southern Methodist Univ., Dallas.

Texas has a number of interesting cultural institutions. At San Antonio are the Alamo, the San José Mission, the restored palace of the Spanish governor, and La Villita, a restored village of the colonial period. The Hall of State in Dallas, built to celebrate the centennial of Texas independence, is the home of the Dallas Historical Society, with murals and statuary relating to Texas history. Houston has a Museum of Fine Arts, with paintings by European masters and an unusual collection of handicrafts by Indians of the Southwest. Also in Houston are a monument and a museum commemorating the victory at San Jacinto during the Texas War of Independence. McDonald Observatory, near Ft. Davis, atop Mt. Locke is one of the largest in the U.S. At Austin, the Texas Memorial Museum has exhibits showing the life and handiwork of the Indians; a large natural history section; and works by Chinese, Indonesian, African, and Japanese artists. Texas is the only state which maintains three major symphony orchestras (Houston, Dallas, and San Antonio), and the Univ. of Texas sponsors an outstanding annual Shakespeare program.

GOVERNMENT

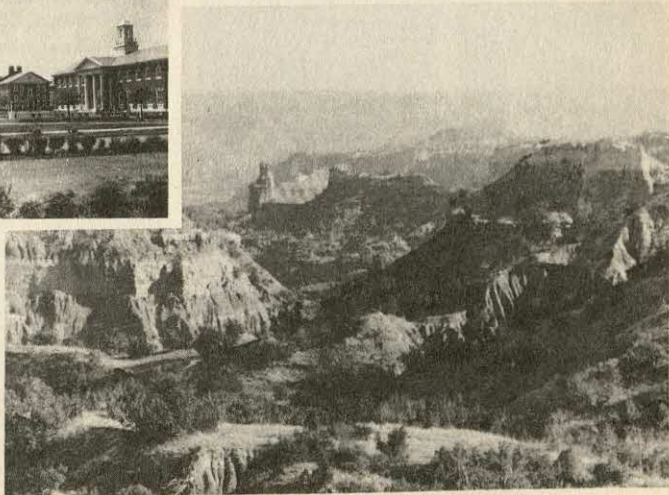
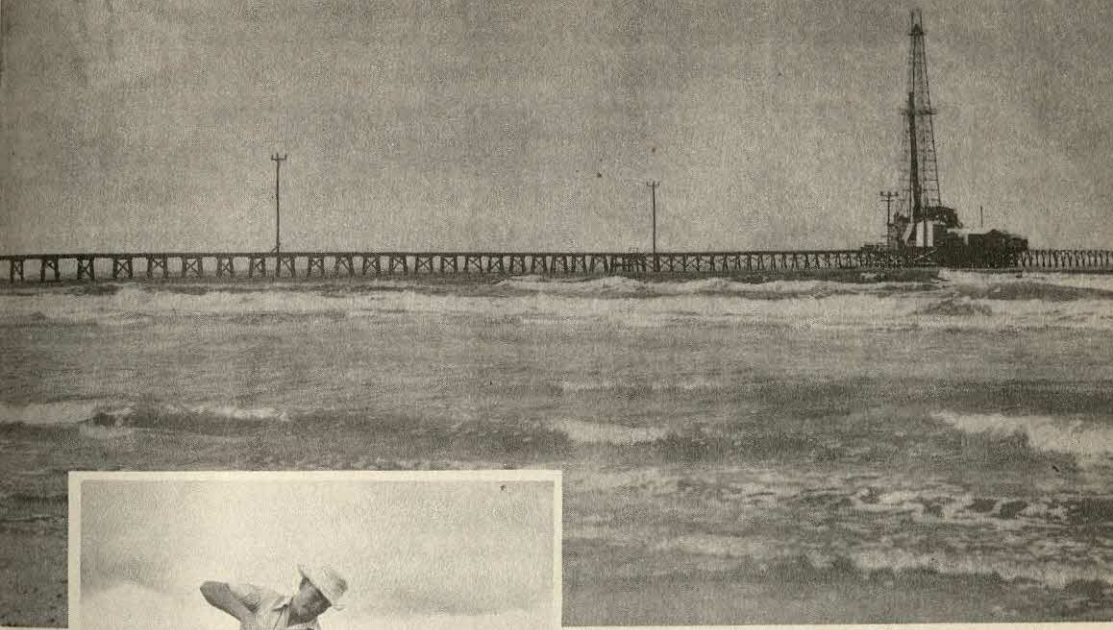
Texas is governed under provisions of a constitution dating from 1876 and amended many times. The constitution gives executive power to a governor, lieutenant governor, secretary of state, controller, treasurer, attorney general, commissioner of the general land office, commissioner of agriculture, and three railroad commissioners. Except for the railroad commissioners, who are elected for six-year terms, all these officials serve two-year terms. The legislature consists of a senate of 31 members, serving staggered terms of four years each, and a house of representatives with 150 members, all elected every two years. The legislature convenes regularly in Austin, the capital city, on the second Tuesday of January of the odd-numbered years, for a session limited to 120 calendar days. The supreme court has nine

justices elected for terms of six years. The highest court for criminal cases is the court of criminal appeals, which has three justices and two commissioners. Other courts include 134 district courts, 11 courts of civil appeals, and county courts. Texas is represented in the U.S. Congress by two Senators and 22 Representatives.

HISTORY

Texas was originally the home of the Caddo, Karankawa, Arapaho, Kiowa, Apache, Wichita, Tonkawa, and the fierce Comanche Indians. The first white man to see Texas was Alonso de Pineda, a Spanish explorer who sailed along the Gulf of Mexico in 1519. In 1528 another Spaniard, Alvar Núñez Cabeza de Vaca, found himself shipwrecked on the Texas coast near present-day Galveston. Striking out overland to reach civilization, he and three companions made an amazing journey across the continent, and were discovered eight years later wandering near the Gulf of California by Spanish soldiers. The well-equipped expedition of Francisco Vázquez de Coronado explored part of Texas in 1541 while searching for the legendary "seven cities of gold." In 1682 the Spanish made the first permanent settlement at Ysleta, near modern-day El Paso. The French entered the scene in 1685 when René Robert Cavelier, Sieur de La Salle, established an outpost for his Louisiana colony at Matagorda. Although this settlement failed, it worried the Spanish and caused them to establish more missions and forts of their own during the next few years. In 1718 San Antonio de Bexar was founded, which became the capital of the province and the home of the royal governor. Spain tended to look upon Texas rather as a shield for more important colonies to the south, however, than as a valuable holding in its own right.

In 1803 the U.S. claimed the land down to the Rio Grande as part of the Louisiana Purchase, but Spain disagreed. In 1819, as part of the treaty by which the U.S. bought Florida, U.S. claims to Texas were given up, and the Sabine River became the boundary. Americans, especially Southerners, however, remained interested in Texas land. In 1820 Moses Austin arranged with the Spanish government to bring in a number of American settlers on a large grant of land. Austin died in 1821 before carrying out his plan, and Mexico became independent of Spain in the same year, but Austin's grant was confirmed to his son, Stephen F. Austin, by the new Mexican government. Soon thousands of Anglo-American farmers were pouring into Texas. At first, Mexico was glad to have these settlers, who strengthened the hold of the shaky new nation against a return of the Spanish. But the Mexicans later became alarmed by the number of American im-



VARIETY IN THE LONE STAR TRADITION

Oil has proved a spectacular source of the state's wealth, both on land and offshore (*above*), and has brought rapid economic advances (*courtesy Ewing Galloway, N.Y.*). Before the discovery of oil, cattle raising on great unfenced ranches was the principal activity. Livestock remains important, and the cowboy's art (*above left*) is still practiced (*courtesy Standard Oil Co., N.J.*). Dallas is the home of many famous educational institutions, including Southern Methodist Univ., with such schools and colleges as the Perkins School of Theology (*below left*). The university's recent expansion program is typical of the city's steady growth (*courtesy Dallas Chamber of Commerce*). Palo Duro Canyon (*below*), near Amarillo, the striking result of 90,000,000 years of erosion, is among the scenic wonders which attract thousands of tourists each year (*courtesy Texas Highway Dept.*)

MAJOR RECREATIONAL AND HISTORIC FEATURES

| <i>Name and Type</i> | <i>Size and Location</i> | <i>Points of Interest</i> |
|--|---|--|
| Big Bend National Park established 1944 | 708,221 acres, in the southwest, in the bend of the Rio Grande (state 118, 227) | Spectacular mountain scenery; unusual geological features |
| Angelina National Forest established 1936 | 391,300 acres, in the east, near Lufkin (U.S. 59, 69; state 63, 147) | Sandy hills; pine and hardwood forests; Angelina River; lakes |
| Davy Crockett National Forest established 1936 | 394,200 acres, in the east, near Crockett (U.S. 267; state 7, 21, 94, 103) | Pine and hardwood forests; management demonstration area at Ratcliff Lake |
| Sabine National Forest established 1936 | 439,665 acres, in the east, on the Louisiana border (U.S. 96; state 21, 87) | Overflow lakes; Boles Field Fox Hunting Area |
| Sam Houston National Forest established 1936 | 491,800 acres, in the east, near Huntsville (U.S. 75, 190; state 150, 156) | Part of the "Big Thicket" area; pine and hardwood forests; Sam Houston State Monument nearby |
| Balmorhea State Park established 1934 | 950 acres, in the west, near Pecos (U.S. 290; state 17) | San Solomon Springs, which feed Lake Balmorhea; large, walled swimming pool; recreation area |
| Palmetto State Park established 1936 | 320 acres, south of Austin (U.S. 183) | Floating islands; geysers; sulfur springs; interesting subtropical plants |
| Palo Duro Canyon State Park established 1933 | 15,103 acres, southeast of Amarillo (U.S. 87; state 217) | Brilliantly colored 800-ft. canyon in the Llano Estacado; old cattle trail nearby |
| San Jacinto State Park established 1907 | 445 acres, near Houston (state 225, 134) | San Jacinto Battlefield, site of the defeat of Santa Anna's army by Sam Houston (1836); museum |

migrants. The Americans had already agreed to Mexican laws forbidding slavery and requiring them to accept the Catholic faith in order to receive land. Now the Mexican government added decrees forbidding trade with the U.S., disallowing future immigration, and outlawing the carrying of weapons. As a result, the Texans revolted.

Late in 1835, the Texans organized a government, and on March 2, 1836, declared their independence. Sam Houston, a Tennessean, was put in charge of the army, while Santa Anna, the Mexican president, took personal command of the army that set out to crush the revolt. From

Feb. 23 to March 6, a small band of Texans, including Davy Crockett and the commander, Col. William B. Travis, held out in a stone mission building in San Antonio called the Alamo against Santa Anna's army. No Texan soldiers survived the siege. All were slain and their bodies burned. The only survivors were about 15 noncombatants, mostly women and children. "Remember the Alamo" became the Texans' battle cry as they sought revenge. Coming upon the Mexican army unexpectedly near San Jacinto on April 21, 1836, Houston and his men swooped down, routed the enemy, and took Santa Anna himself prisoner. The war was over. Sam Houston was elected president of the new Republic of Texas.

Texas remained an independent nation for about ten years but constantly sought admission to the U.S. The South was anxious to have Texas annexed in order to extend slavery, but the North objected for the same reason. On Dec. 29, 1845, however, Texas was admitted to the Union. Mexico had never really accepted the independence of Texas, and its admission to the Union soon brought difficulties. Mexico announced that the Nueces River must be the northern border of Mexico, while the U. S. answered by stationing troops along the Rio Grande, much farther south. War broke out in 1846, and the Mexicans were defeated by 1848.

The continuing dispute between North and South flared up over what was to be done with the territory gained from Mexico after the war. This was dealt with in the Compromise of 1850. As part of this settlement, Texas agreed to give up those sections of its territory that now form parts of Colorado, Kansas, New Mexico, Oklahoma, and Wyoming, in exchange for \$10,000,000.

A slave state from its beginning, Texas entered the Southern Confederacy on Jan. 28, 1862. During the war, Galveston was seized by Union troops; and after Gen. Robert E. Lee's surrender, the last battle of the war was fought, on May 12,

HOUSTON, TEXAS

A typical example of a Southern mansion

Courtesy Ewing Galloway





1865, at the Palmito Ranch, about 12 m. s. of Brownsville, at the extreme southern tip of Texas. Texas was hard hit by the abolition of slavery and by the Reconstruction days that followed the war. Readmission to the Union did not come until 1870.

After that time, Texas developed rapidly. Cattle were cheap to raise on the Texas plains but hard to transport to market. When the railroads reached out across Kansas in the 1860's and 1870's, a colorful period in U.S. history was launched by the Texas cattlemen as they drove huge herds of cattle north along the Chisholm Trail and others to "cow towns" such as Dodge City and Abilene in Kansas.

Another chapter opened in 1901 when the Lucas Gusher came in at Spindletop near Beaumont, the first of several huge oil fields to be tapped in Texas, which today leads the nation in oil production.

Texas contributed 192,000 service personnel during World War I, and 827,052 during World War II. In the second war, Texas oil and beef, and Texans themselves made outstanding contributions to victory. Thousands of U.S. soldiers and fliers received their training in such camps and airfields as Ft. Sam Houston and Ft. Bliss, Randolph Field and Kelly Field. Since the war Texas has continued to grow economically; there has been a phenomenal expansion in industry and trade. Although agriculture is still the greater employer, the yearly income from manufacturing is more than twice that from agriculture.

See also separate entries on most of the individuals and geographical and historical subjects mentioned in this article.



TEXAS LANDMARKS

Marshall (or Marshal Field) Dam (top) is on the Colorado River, near Austin (Photo by Neal Dingle, *Austin*). The Confederate Monument (above) on the capitol grounds is topped by a statue of Jefferson Davis (Photo Louis Tager, courtesy Ewing Galloway, N. Y.)

Texas City, an industrial city in Galveston County, Texas, 9 m. n.w. of Galveston. Located on the mainland, on the southeast coast of Galveston Bay, it is 11 m. from the Gulf of Mexico. Its harbor places the city fourth in the

amount of commerce handled by Texas ports. A major wartime center, it produces petroleum and styrene, an ingredient of synthetic rubber. On April 16, 1947, much of the city was destroyed by fire and explosion, when a nitrate-laden ship in the harbor exploded. Hundreds of persons were killed, and thousands were injured. The damaged portion has since been rebuilt. Population, 1950, 16,620.

Texas, UNIVERSITY OF, a coeducational state institution of higher learning at Austin, Texas, founded in 1881 and opened in 1883. It comprises schools of architecture, arts and sciences, business administration, education, engineering, fine arts (music), law, library science, pharmacy, social work; dentistry (Houston), medicine (Dallas, Galveston), nursing (Galveston), and a postgraduate school of medicine (Galveston); and a graduate school. There are branches at Houston, Dallas, El Paso, and Galveston. Its auxiliary divisions include 23 bureaus and institutes for research and a large extension division. The annual student enrollment totals ca. 17,800, and there are some 1,300 members of the faculty. The library has about 1,275,000 volumes. The physical plant of the main university is valued at ca. \$72,000,000.

Textile (*těks'til*), a woven material. See also *Cotton*; *Rayon*; *Tapestry*; *Wool*; *Weaving*.

Thackeray (*thăk'ēr-ă*), WILLIAM MAKEPEACE, novelist, born in Calcutta, India, July 18, 1811; died in London, Dec. 24, 1863. Born in India, where his father was an English civil servant, Thackeray was brought to England very early, after the death of his father and the remarriage of his mother. After studying at several schools and at home, Thackeray entered Cambridge in 1829, leaving without a degree in 1830. After a year on the continent, he returned to England in 1831 and entered the Middle Temple to study law. In 1852 he inherited a considerable fortune, most of which he soon lost, and in 1834 he went to Paris to study art. In 1837, having married, Thackeray returned to London and began an active journalistic career. His family life was not happy, for Mrs. Thackeray became insane in 1840 and remained insane until her death in 1892. Her illness left Thackeray with the care of two daughters.

From 1837 until the end of his life, Thackeray was a contributor to many leading magazines. To *Fraser's Magazine* he contributed "The Yellowplush Papers," among other things. To *Punch* he was a contributor from its beginning; it was there that his "Book of Snobs" appeared. From 1859-62 he was editor of the *Cornhill Magazine*, and he continued to write for it even after he resigned his editorship. Thackeray's most important works, those upon which his great reputation as a novelist rests, are "Vanity Fair,"



Courtesy Metropolitan Museum of Art, N. Y.

WILLIAM MAKEPEACE THACKERAY

Drawing by L.S. Leighton (1830-1896)

published in 24 monthly numbers from 1846-48; "Pendennis," completed in 1850; "Henry Esmond" (1852); "The Newcomes" (1854); and "The Virginians" (1859). Of course, "Vanity Fair" has the greatest reputation and is most widely read. If the characters of Amelia Sedley and the long-suffering Dobbin are sentimentally treated and are sometimes not quite convincing in their perfection, the more important and less "perfect" characters of Becky Sharp and Rawdon Crawley make ample amends. If there are wiser and more amusing novels than "Vanity Fair" they are very few.

"Henry Esmond" alone of Thackeray's other works is equal to "Vanity Fair" in importance. Although it lacks something of the scope of "Vanity Fair," "Henry Esmond" is a more carefully written book. One of the best of all historical novels, it is the only one of Thackeray's chief works not marred by his journalistic willingness to let well enough alone. No other English novel recreates so completely and so consistently the spirit of an age earlier than the novelist's own. When told by Anthony Trollope that "Esmond" was his best work, Thackeray responded that that had been his intention. He was less sure, however, than Trollope of his success.

In addition to his novels, Thackeray wrote many humorous sketches, a considerable amount of respectable light verse, and two notable volumes of lectures: "The English Humourists of the 18th Century" and "The Four Georges."

Thailand (*tă'ê-land*). See *Siam*.

Thalberg (*tăl'bêrk*), SIGISMUND, Austrian pianist and composer, born at Geneva, Switzerland, Jan. 7, 1812; died at Naples, Apr. 27, 1871. He was a son of Prince Moritz von Dietrichstein, who provided for his musical education at Vienna. In 1830, he began to appear in public, and four years later was made chamber

virtuoso at the court of Austria. He appeared in Paris as the rival of Liszt, and won applause in many countries of Europe and in the U.S. In 1855 and 1862, he made a tour of Brazil and other countries of South America. He wrote numerous compositions for the piano.

Thaler (*tä'ler*), a monetary coin first made in Bohemia in 1519, where it was known as *Joachimsthaler*, from Joachimsthal, the town where it was first minted. This coin was the unit of value in Germany until 1873, when it was superseded by the mark.

Thales (*thä'lēz*), Greek philosopher, born in Miletus, Asia Minor, about 640 B.C.; died in 548 B.C. Little is known of his life, but he is classed as one of the seven wise men and is considered the founder of Greek astronomy, geometry, and philosophy. He was of noble birth and it is thought that he received instruction in geometry from the priests of Egypt, where he evidently spent a number of years. After returning to Greece, his reputation for wisdom and learning spread with remarkable rapidity, and his renown was extended when he predicted an eclipse of the sun which is thought to have taken place on May 28, 585 B.C. He taught his doctrines orally to his disciples instead of committing them to writing, and it is only from the later writers of Greece, such as Herodotus and Aristotle, that we know anything about him.

For Thales, water represents the essential element, out of which everything developed. It was for him a cosmic matter and from it all other matter was transformed continuously and sooner or later reverted into it. Although today we cannot, of course, recognize his opinions about facts of natural science, philosophically his concept of continuous change and transmutation is still of greatest importance. Certain geometric discoveries, technical inventions, and astronomic calculations are attributed to him. In any case, his knowledge of natural science and technique must have been extraordinary for his period.

Thalia (*thä-tä*), in Greek mythology, one of the nine Muses. She presided over comedy and idyllic poetry. In statuary she is represented with the comic mask, a wreath of ivy and the shepherd's staff.

Thallium (*thäl'i-um*), a soft, white, crystalline metal occurring in small quantities, used in alloys and glassmaking. It is slightly heavier but softer than lead. Thallium has a specific gravity of 11.9, its salts are exceedingly poisonous, and it imparts a green color to a flame. Crookes discovered this metal in 1861 by the use of the spectrum, while inspecting deposits accumulated in a sulfuric-acid factory. Small quantities of thallium occur in iron pyrites, and it is obtained from the dust which collects in the flues of sulfuric-acid works when these pyrites

are burned for the production of sulfur dioxide. It is found in native sulfur and with copper.

Thallophytes (*thäl'ô-fīts*), second largest division of the plant kingdom (seed plants being the largest). It is considered one of the oldest of plant divisions, containing the most primitive of types. Member plants vary in size from one-celled types, microscopic in size, to seaweed 200 in. long. They are characterized by the absence of root, stem, or leaves, although some do have structures that resemble these parts in form. Thallophytes are divided into two main groups: *algae*, which have chlorophyll, and *fungi*, which lack chlorophyll. A third group of Thallophytes is composed of plants formed by the union of algae and fungi; these are called *lichens*. Reproduction is both sexual and asexual.

Thames (*tēmz*), a river in England, which rises in the Cotswold Hills and, after a course of 210 m. toward the east, flows into the North Sea. The basin has an extent of 5,425 sq. m. In the greater part of its course it forms the boundary line between a number of the counties of southern England. Large vessels ascend to London, 60 m. from its mouth. It is of vast commercial importance because of numerous canals that connect it with trade and manufacturing centers, and because it makes the inland city of London a world port. Many bridges cross it at London, where extensive embankments and dock improvements are maintained. The tide is perceptible 70 m. up the river from its mouth, which is 18 m. wide. Among the principal cities on the Thames are London, Gravesend, Greenwich, Windsor, Eton, Henley, Reading, and Oxford. Its tributaries include the Kennet, Mole, Darent, Medway, and Roding.

Thames, BATTLE OF THE, an engagement of the War of 1812, fought at the Moravian settlement on the Thames River, in the Province of Ontario. It occurred on Oct. 5, 1813, when the Americans under Gen. Harrison made an attack upon the British under Gen. Proctor. The latter was aided by a force of Indians under Tecumseh, who was slain, and the British were defeated. Col. Richard M. Johnson led a famous cavalry charge against the British and it is claimed that he personally slew Tecumseh. The result of the battle was that the British lost all the advantages gained by Hull at Detroit and the confederation of Indians was broken.

Thamugadi (*thām-ū-gā-dī*), or THAMUGADIS, or THAMUGAS. See *Timgad*.

Thane (*thān*), a term of Anglo-Saxon origin used to designate a particular class of freemen attendant on a king or overlord. The thane, by virtue of his ownership of a certain minimum amount of land, assumed hereditary obligations, military and otherwise, to the overlord. His rank was later succeeded by that of baron.

Thanet (*thān'it*), ISLE OF, once an island of England, on the northern coast of Kent, separated from the mainland by the Stour River and its branches, but now joined with the mainland, as the river has dried up. It is about 4 m. wide and 10 m. long. The area is 41 sq. m. The surface is level and fertile, suitable for agriculture and stock raising. Ramsgate, Broadstairs, Westgate, and Margate are famous as watering places. Population, *ca.* 95,000.

Thanksgiving Day (*thānks-giv'ing dā*), a festival of thanksgiving for the harvest and mercies of the closing year. It somewhat resembles the feast of ingathering held by the Hebrews. The Pilgrim Fathers at Plymouth, in 1621, kept the first harvest thanksgiving in America, and in the succeeding centuries the practice was frequently repeated. In many of the colonies the governors appointed a day for rejoicing in the autumn, especially in the New England states, where thanksgiving services have been popular from the early settlements and where Thanksgiving Day still ranks as the special annual festival. Thanksgiving services were recommended by Congress for each year of the Revolutionary War, and in 1784 a special day of thanksgiving, was appointed for the return of peace. After the adoption of the Constitution, in 1789, Washington appointed a thanksgiving day, while a special thanksgiving for the welfare of the nation was given in 1795, and another for the return of peace was appointed by Madison in 1815. The festival has been observed annually in New York since 1817, but its general observance in the U.S. dates from 1863, when Lincoln issued a proclamation recommending that the last Thursday of November be observed as Thanksgiving Day. All the succeeding Presidents have regularly issued proclamations calling the attention of the nation to the observance of this festival, which ranks as a legal holiday, and the duty of observing it in a fitting manner is likewise proclaimed by the various governors, in whom alone is vested the legal authority to declare a holiday within the states.

Thasos (*thā'sōs*), an island in the Aegean Sea, off the coast of Macedonia. It has an area of 167 sq. m. The surface is mountainous and quite barren and near the center of the island is Mt. Hypsarion, height 3,428 ft. Lumber, honey, olive oil, gold, and wine are the chief products. The island was colonized by the Phoenicians at an early date and was captured by Darius in 492 B.C. It was subject to Athens for many years and later to the Romans. The Turks captured it in 1462 and held it until 1913, when it was ceded to Greece. Population, *ca.* 13,000.

Thayer (*thār*), SYLVANUS, soldier and military engineer, born in Braintree, Mass., June 9, 1785; died there Sept. 7, 1872. In 1807, he was



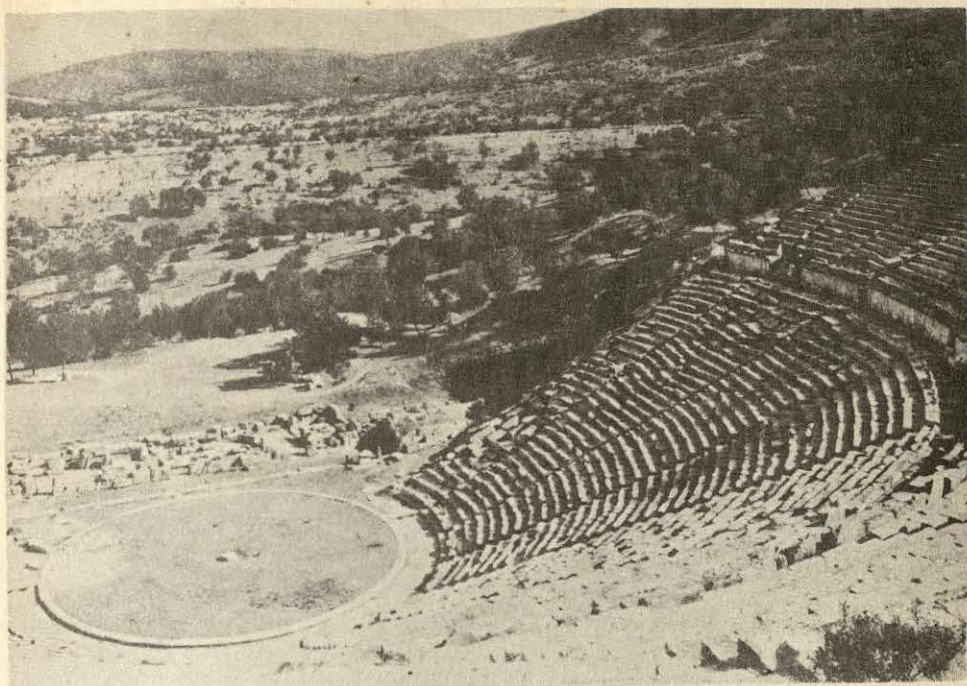
Courtesy Public Relations Office, West Point, N. Y.

SYLVANUS THAYER

graduated from Dartmouth Coll. and the following year from the U.S. Military Acad. He was assigned to the engineer corps, and served as engineer and instructor in mathematics at the academy for four years. He was made first lieutenant for gallantry in the War of 1812. He served under Gen. Wade Hampton on Lake Champlain in 1813, and the following year went to Europe to examine military works and study the operations of the allied armies at Paris. In 1817, he became superintendent of the U.S. Military Acad. at West Point, where he rendered valuable services in bringing that institution to its present efficient condition. He retired from West Point in 1833 and spent the succeeding 30 years in constructing defenses at Boston harbor. In 1863, he withdrew from active service with the rank of brigadier general. Thayer wrote a number of valuable papers on engineering. He gave liberally toward the extension of education. Among his gifts are \$10,000 to the public library at Braintree, \$300,000 to an academy at Braintree, and \$70,000 to the Thayer School of Civil Engineering at Dartmouth. A monument to his memory at West Point bears the inscription, "Colonel Thayer, Father of the U.S. Military Academy."

Theater (*thē'ā-tēr*), a building especially adapted to the representation of dramatic, operatic, or spectacular performances. The theater had its beginning in Greece where, at the foot of a slope, the chorus sang and danced about an altar. The spectators sat on steplike tiers.

The first important theater was the Dionysiac, located at the foot of the south side of the Acropolis of Athens, from which it was partly hollowed out. Performances started here in provisional wooden structures at the beginning of the 5th century B.C. A stone building was



GREEK THEATER AT EPIDAUROS, 5TH CENTURY B.C.

Greek theaters utilized the surrounding landscape as a scenic background for their performances

erected in the second half of the 4th century B.C. having a capacity of nearly 30,000 people. All the celebrated Greek theaters were similarly constructed, a fact evidenced by the ruins of ancient cities, but the Romans began to build them on level sites in the 1st century B.C. Some of these theaters surpassed in magnitude the finest temples, many having a capacity of 10,000 to 30,000 persons, and others holding even a much larger number. The theater of Marcellus at Rome, whose external walls are still in existence, had a seating capacity of 30,000 spectators.

The theaters of Greece were semicircular, resembling the half of an amphitheater, and that part in which the chorus sang and danced was called the *orchestra*. The stage for the performers was behind the orchestra, facing the audience, and back of the stage was a permanent and finely decorated scene. The large paintings at the rear of the stage represented landscapes or buildings in keeping with the plot of the drama. Roman theaters were similarly constructed, but the space between the stage and the audience was reserved to the senators instead of being occupied by the chorus. The seats were arranged in tiers on a concentric plan and the buildings were not covered by a roof, but the portion containing the stage and chambers connected with it was usually surrounded by a portico.

Stage scenery was entirely unknown in the early period of the theater, but later it was in-

troduced gradually. The Romans employed stage effects more elaborate than those used in Greece. Pericles made the theaters free to the public, the expense being borne by the government, and the dramas were designed to teach the people history, poetry, oratory, and other branches of useful knowledge. The theater declined with the decadence of Rome, and the only theatrical entertainments given during the Middle Ages consisted of the miracle plays, interludes, and mysteries, which were presented in many places in the churches and cathedrals, as well as in halls and convents. In many cities theatrical plays were acted in the open air.

The modern theater dates from the revival of classical literature in the 16th century, when the classical drama was revived. The theater at Vicenza (1582), called after its architect the Palladian Theater, is still perfectly preserved. It forms a link between the Roman theater, from which it carried over the five doorways, and the modern theater, as a main feature of which it shows vistas or "perspectives" seen through the doorways. These vistas, comparable to modern scenery, were not changeable. This step was taken by another Italian theater, the Teatro Farnese in Parma, built 1618. Here the stage, separated from the auditorium by a curtained arrangement, introduced the modern proscenium, and the auditorium proper was U-shaped rather than semicircular. Among the first theaters of modern times is the one opened in

THEATRE GUILD

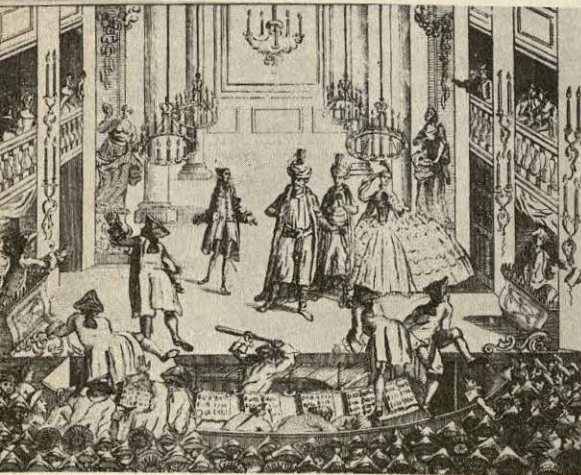


ELIZABETHAN STAGE, EARLY 17TH CENTURY

Public theaters of the Elizabethan period were similar in shape and arrangement to the inn courtyards which were first used for drama presentations. Scenic devices were sparse. The characters shown are from popular plays of the period

PUBLIC THEATER, 18TH CENTURY

By the 18th century, stages were beginning to look like those of today. Movable scenery was not yet used, but there was a permanent architectural stage setting. Many wealthy persons still had small theaters in their homes



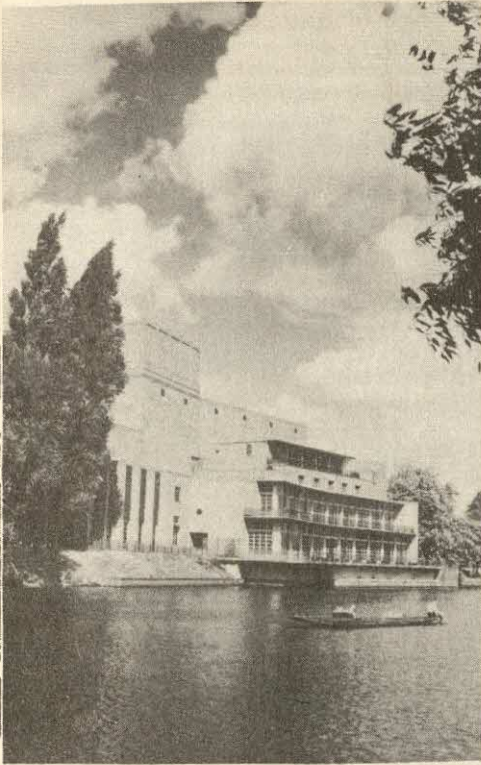
Paris by the Confraternity of the Trinity in 1548, at which secular performances were given. In 1576, the first theater was erected in London, England, and about the same time were constructed the playhouses in Whitefriars, in Blackfriars, and the Curtain in Shoreditch. The playhouse in Blackfriars became famous as the scene of Shakespeare's plays, and the success attending them stimulated many others to write and act. Cardinal Richelieu built the Palais Royal in Paris in 1639, which, in the time of the Revolution, became one of the most famous theaters of Europe, being then known as the Théâtre Français. France now has theaters of great beauty and artistic dignity, and the Grand Opera of Paris still ranks among the largest and finest in the world.

The first theater built in America was opened at Williamsburg, Va., in 1752, but performances in halls and other buildings date practically from the first settlements. Theaters are controlled by national laws in most European countries, but in the U.S. and Canada they are regulated and licensed by the municipal corporations. Problems of lighting and acoustics have been closely studied in the modern theater, whose general layout is based chiefly on the Italian Baroque theater, consisting of three main parts: the stage with room for mechanical equipment and storage room for scenery; the auditorium, usually with the seats arranged in curved rows, and including one to four tiers of balconies; and the outer lobby with the entrance doors. The larger theaters of North America include the Metropolitan Opera House, New York, and the Chicago Opera. The large movie theaters, such as the Radio City Music Hall and the Roxy Theater in New York City, follow the usual theater architecture. In contrast to these large buildings, the so-called "little theater" has recently come into use, adapted to more intimate chamber plays and to amateur theater groups. Often such theaters use the "theater in the round" arrangement, by which the audience sits on three sides of the stage. Open-air performances, such as New York's presentations of Shakespeare in Central Park, have also witnessed a certain revival and are especially popular in warm climates or seasons.

See also *American Literature; Drama*, and Literature sections of individual countries.

Theatines (*thē'ā-tīnz*), an order of monks in the Roman Catholic Church. It was founded in 1524 by Pope Paul IV, who was then bishop of Theate, hence its name. Formerly it had a large membership in Spain, Portugal, and France, but at present it is represented chiefly in Italy. Its main object was to oppose heretics, to reform the clergy, and to attend the sick and criminals.

Theatre Guild (*thē'ā-tēr gild*), INC., THE, an



SHAKESPEARE MEMORIAL THEATER

At Stratford-on-Avon, this modern playhouse is dedicated to the production of the works of the great bard

organization founded in 1919 and devoted to the artistic development of the American theater through the production of plays. Since its first production, "Bonds of Interest," in the first year of its existence, the Guild has continued the uninterrupted production of plays. Its members buy season tickets in advance for a specified number of plays to be presented by the Guild. Today there are Guild subscription audiences in 15 American cities, and production averages six new plays a year as well as occasional revivals. Besides introducing many new actors and playwrights, the Guild has been influential in forming American theatergoers' tastes. It presented the world premiere of George Bernard Shaw's "Saint Joan" (1923), and also introduced Eugene O'Neill's "Strange Interlude," "Marco Millions," "Mourning Becomes Electra," "Ah, Wilderness" and "The Iceman Cometh." Guild productions have won a number of Pulitzer prizes; in addition to straight dramas, the Guild has produced a folk-opera, "Porgy and Bess," and such musical comedies as "Oklahoma" and "Carousel."

Thebes (*thēbz*), a celebrated city of ancient Egypt, which was for centuries the capital of that country. It occupied an extensive site on

both sides of the Nile, about 300 m. s. of Cairo, and is thought to have been founded by Menes, the founder of the Egyptian monarchy. The river divided the city into four parts, two on each side of the Nile. Those lying on the east bank were known as Karnak and Luxor, and those on the west bank, as Gurnah and Mendinet-Habu. The city had its greatest prosperity for the five centuries included between 1500 and 1000 B.C., and it began to decline rapidly about 800 B.C., when Memphis, the ancient capital of the Pharaohs, rose to importance as a rival city. No ancient city contains more splendid ruins than Thebes, but now only a few Arabs occupy its site, earning their subsistence by directing tourists to the different places of interest. The Palace of Luxor and the Temple of Karnak, of which ruins still remain, occupied imposing sites on the east side of the Nile, and in front of the former were beautiful obelisks of red granite. One of these obelisks is now in Paris, in the Place de la Concorde.

Thebes was the seat of the cemeteries of the Theban monarchs. Fine sepulchers were hewn in the rock, and from them thousands of mummies have been taken. On its site are the remains of extensive temples, palaces, and monuments. The notable statues include the one of Memnon, which is in ruin. The statue was supposed in early times to give out at sunrise a sound like the twanging of a harp string; it has been suggested that the sound was made by a person concealed within, or that some natural element or artificial device gave out a sound on being warmed by the rising sun. Other objects of interest include the Memnonium or temple of Rameses II, the temple and palace of Rameses III, the tomb of Seti I, and the portico of Shishak I. Thebes was able to send forth powerful armies of charioteers, who enriched its temples and palaces with the wealth brought from Ethiopia, Arabia, and Asia Minor. It is estimated that the Persians obtained \$10,000,000 in valuable spoils at the time Cambyses plundered the city in 525 B.C., but it was not finally destroyed until about 86 B.C. See also *Archaeology*.

Thebes of THEBAI, a city of ancient Greece, in Boeotia, 30 m. N.W. of Athens. Thebes is said to have been founded by Cadmus (*q.v.*), for whom its strong citadel or acropolis (the Cadmea) was named. The city is rich in associations with legendary or mythological figures, including Oedipus, Amphion, the Seven against Thebes, and the Sphinx (*qq.v.*). It was the reputed birthplace of Hercules and Dionysus and of the seer Tiresias. Settled by the Boeotians from Thessaly, Thebes quarreled with Athens toward the end of the 6th century B.C., was an ally of Persia during the Persian Wars, and was defeated by Athens at Oenophyta (456 B.C.). Thebes

sided with Sparta against Athens in the Peloponnesian War, but, distrusting the growing influence of Sparta in Greece, joined a confederation against Sparta in 394 B.C. The Thebans, led by the great warrior Epaminondas, finally defeated the Spartans at Leuctra (371). Thebes thereafter rose to the foremost political power in Greece—a glorious, yet shortlived, period in the history of the city. In 338 the Thebans were persuaded by the eloquence of the orator Demosthenes to join with the Athenians against the encroachments of Philip of Macedon. The combined forces shared a crushing defeat at Chaeronea. Stripped of their political dominance, the Thebans soon rebelled against their captors, only to be overcome by Philip's son, Alexander the Great, who attacked and razed the city (336). Although Cassander rebuilt Thebes in 315, it never recovered its former ascendancy. The city was heavily damaged by the Romans, particularly under Sulla.

The modern Thevai is built on the site of the old city's acropolis. It enjoyed some prosperity during the Middle Ages as a commercial center noted for its silk textiles. Population, ca. 12,000.

The Dalles. See *Dalles*.

Theia (*thē'g*), in ancient Greek legend, a Titaness, daughter of Uranus and Gaea (sky and earth), sister and wife of Hyperion, and mother of the sun, the moon, and the dawn.

Theiler (*thē'ler*), MAX, bacteriologist, born in Pretoria, South Africa, Jan. 30, 1899. He studied at the Univ. of Capetown and received his medical degree from the London School of Hygiene and Tropical Medicine (1922). Thereafter, he was an assistant in tropical medicine at the Harvard Medical School and, since 1930, has been a staff member of the Rockefeller Foundation in New York City. Theiler's researches into the yellow fever (*q.v.*) virus led (1939) to his discovery of vaccine 17-D, used extensively in World War II to prevent the disease. For this work he was awarded the 1951 Nobel Prize in physiology and medicine. Theiler has also conducted research into the causes and immunology of several virus diseases, including dengue fever, encephalitis, and infantile paralysis.

Theism (*thē'iz'm*), in the philosophy of religion, the doctrine that there is a single, personal God, who not only has created the world, but who continues to take active interest in His creatures and to manifest His presence through His works. Theistic religions are sharply opposed to the pantheistic doctrine, according to which God is identical with nature, as well as to the deistic view that though God has created the world He does not continue to play an active role in guiding its processes. Judaism and Christianity are examples of theistic religions; the philosophy of Spinoza is perhaps the best-

known example of occidental pantheism, though many of the Oriental Indian religions also illustrate it; and many famous writers of the 18th century, including Voltaire in France and Thomas Jefferson in America, were exponents of deism (*q.v.*).

Theiss (*tis*) or TISZA, a river in Hungary, which rises in the Carpathian Mts. and, after a course of 825 m., joins the Danube about 20 m. above Belgrade. The river is formed by two branches, the White Theiss and the Black Theiss, and its general upper course is toward the northwest, but it makes a bold curve in north central Hungary and flows toward the southwest, while its lower course is almost parallel to the Danube for 300 m. The Körös and Maros are its principal tributaries. It is remarkably rich in fish and is navigable to Szolnok. The towns on its banks include Szegedin and Zenta.

Themis (*thē'mis*), in ancient Greek legend, a Titaness, daughter of Uranus and Gaea (sky and earth) and mother by Zeus of the Horae and the Fates; in one legend she is also the mother of Prometheus. From her mother Gaea, Themis received the oracle of Delphi. Her prophetic gift enabled her to forewarn Prometheus of his approaching fate. In later times Themis became an abstract personification of law, order, and justice.

Themistocles (*thē'mis'tō-klēs*), Athenian military leader and statesman, born ca. 528 B.C.; died in Magnesia, Asia Minor, in 460(?) B.C. As a youth, Themistocles was noted for his intellectual abilities, as well as for his ambition for personal prestige and power. A daring and resourceful man, Themistocles made his bid for the political leadership of Athens by challenging the power of Aristides, who was ostracized in 483.

Assuming political command at a time when the Athenians lived under the constant threat of a Persian invasion, Themistocles undertook to fortify Athens and Piraeus. He emphasized the effectiveness of naval resources in combating the Persians and urged the Athenians to use the produce of the Laurium silver mines in building ships. Upon the approach of Xerxes, the Persian, he evacuated the women and children to Salamis, while the men took to the ships. The great naval engagement at Salamis (480), in which Xerxes' fleet was destroyed, ended the 2nd Persian War and enhanced Themistocles' reputation among the Greeks.

After the defeat of the Persians, Themistocles rebuilt the walls of Athens and completed the fortifications at Piraeus; however, it was not long before his influence began to wane. His unscrupulous methods of obtaining wealth and personal power shook the confidence of the people, as did his involvement in the treason-



THEMISTOCLES

able activities of the Spartan leader, Pausanias. In any case, he was ostracized between 476 and 471 B.C. He took refuge in Argos and then Corcyra and Epirus, finally fleeing to Asia Minor, where he found favor in Magnesia at the court of King Artaxerxes of Persia (465 B.C.). He learned the languages and customs of the Persians and attained a position of considerable influence at the court, presumably because he held out hope of defeating the Greeks. Upon his death a monument was erected to his memory in Magnesia, but his bones were later removed to Athens.

Theobromine (*thē-ō-brō'mēn*), 3,7-dimethylxanthine, $C_7H_8O_2N_4$, an alkaloid present in cacao beans and kola nuts to the extent of 1.5 to 3 per cent. It is present in cocoa in very small amounts, and is used in medicine as a diuretic (in which role it is superior to caffeine) and as a stimulant.

Theocracy (*thē-ōk'rā-sy*), a form of government in which men recognize the immediate sovereignty of God and receive his revelations as civil law. The most famous example of a theocracy is that of the Israelites, to whom the law was given by God through Moses. This continued to be the form of Hebrew government until the time of Saul. In such a government the priesthood or a class of ecclesiastics become the interpreters of the divine commands and serve as the officers both in political and ecclesiastical matters. The early government of the New England colonies, because of the power of the clergy, has sometimes been considered a recent form of theocracy.

Theocritus (*thē-ōk'rī-tūs*), Greek bucolic poet, born in Syracuse, Sicily, or the Aegean Isle of Cos, in the 3d century B.C. Little is known of his life, and of the numerous manuscripts purporting to contain his work, none bears a date earlier than the 13th century. Many of the poems at-

THEODORIC

tributed to him are of doubtful authenticity. It is thought that Theocritus went from Syracuse to the Isle of Cos, and later to Alexandria, Egypt, where he enjoyed the patronage of the Egyptian king, Ptolemy (II) Philadelphus.

Theocritus is regarded as the first and the greatest of the Greek pastoral poets. His work, some 30 idyls, divided into bucolics (of the country), mimes (of the town), epics, and lyrics, displays a marvelous simplicity and remarkable dramatic and mimetic power. Most of the idyls are written in the Doric dialect, but he employed many popular elements, and other dialects, in his verse, according to the subject matter. The verse form is dactylic hexameter.

Theodolite (*thē-ōd'ō-līt*), an instrument used in surveying for measuring angles, both horizontal and vertical, that is, altitude and azimuth. It consists of a small telescope, which can be moved up and down, and the inclination is shown by a graduated circle called the *altitude circle*. In most instruments the telescope is so mounted that it can be twisted around a vertical axis so as to permit measuring the angular distances of objects from the north point, that is, azimuth. Various forms of construction have been followed in making these instruments, depending upon whether they are to be used in astronomical or other measurements. Railroad surveyors usually employ the transit instead of the theodolite. See also *Surveying*; *Transit*.

Theodora (*thē-ō-dō'ra*), Byzantine empress, born, probably in Constantinople, ca. 508; died in 548. As a young woman she is believed to have been an actress, but she later had a reputation for harsh, severe morality. She married Justinian I (q.v.) ca. 523 and, when he acceded to the throne in 527, became coruler with him. Theodora is credited with saving the throne during the riots of 532 by persuading Justinian to resist the rebellious political and religious factions known as the Blues (Monophysites) and the Greens (orthodox Catholics). She is believed to have had some youthful contact with the Monophysites—a group later judged heretical, which upheld the doctrine that Christ had a single "nature," rather than the orthodox two, human and divine, natures. The doctrine was an issue in the political and ecclesiastical split between the East and the West ca. 300 years later.

Theodoric (*thē-ōd'ō-rīk*), King of the Ostrogoths, born near Vienna, Austria, in 455; died in 526 A.D. He was the son of Theodemir, King of the Ostrogoths, and in 475 succeeded his father on the throne. His early life was spent at Constantinople, where he was a hostage at the court for 10 years, and there received special training in connection with the children of Emperor Leo. He returned to his native country in 473 and immediately demonstrated his ability as a warrior



THEODORIC

and military tactician by securing concessions in Dacia and Moesia. On the death of his father, in 475, he was hailed as the chief of his valiant but warlike kinsmen. A war soon broke out between the Ostrogoths and Zeno, emperor of the Eastern Empire from 471 to 491, but the latter saved his capital by persuading Theodoric to invade Italy against the usurper Odoacer, which he did in 488 with an army of 200,000 men. The Ostrogoths were successful near Aquileia in 489, and the following year surrounded the enemy in Ravenna, which they captured after a siege of three years. Odoacer was treacherously murdered at a banquet in 493. Theodoric immediately assumed the title of King of Italy. He governed with remarkable vigor and ability, and successfully resisted the claim of a protectorate preferred by the Eastern emperor. The Franks were expelled from the territory belonging to the Ostrogoths, an insurrection was quelled in Spain, and material improvements were fostered in the civil and industrial affairs of Italy. Though an Arian, he tolerated all forms of Christianity, patronized learning, and established an efficient system of justice. In his long reign of 35 years Italy prospered more substantially than it had for some centuries before. He is mentioned as Dietrich of Berne in the "Nibelungenlied."

Theodosia (*thê-ô-dô'shî-ä*), or FEODOSIYA, or KAFFA, an ice-free Russian seaport and watering place on the southeastern coast of Crimea, on the Black Sea, 62 m. E. of Simferopol. The harbor is capacious, oyster fishing is carried on, and vineyards surround the town, which exports carpets, soap, and caviar. There is a Russian cathedral, a mosque converted into a museum,

and the palace of the former Crimean khans. The Armenian church was built by emigrants from Ani in the 14th century. Mentioned in 375 B.C. as a thriving Greek colony that supplied much of the grain for Greece, it became a Genoese trading port in the 13th century, was captured by the Turks in 1475, and fell to Russia in 1774. It is part of the autonomous Crimean Soviet Socialist Republic. Population, *ca.* 30,000.

Theodosius (*thê-ô-dô'shî-ûs*), surnamed *The Great*, Emperor of Rome, born near Segovia, Spain, about 346; died Jan. 17, 395 A.D. He was a son of the Roman general Theodosius, whom he accompanied on a campaign through France and Britain in 368, and assisted in expelling the Caledonians from South Britain. His father was murdered at Carthage, in 376, and Theodosius routed the Sarmatians in Moesia, but soon after retired to his estate in Spain. Emperor Gratianus called him from retirement in 379 and made him governor of Dacia, Macedonia, Thrace, Egypt, and the East. He expelled the Goths from the eastern provinces, and concluded a peace with them in 382. Later he won the friendship of the Goths by treating them, while his captives, with marks of kindness, and many of the warriors joined his army.

Gratian, ruler of the Western Empire, had been murdered in 383 and his throne had been seized by Maximus, but Theodosius, in 387, undertook to restore the throne to Valentinian II, brother of Gratian. He accomplished this by capturing and putting to death the usurper at Aquileia. However, Valentinian was strangled in 392 by Gen. Arbogastes, and Theodosius made a second invasion of Rome, defeating and slaying Arbogastes in a decisive battle. Thus he was elevated to mastery of the whole Roman Empire. He practiced great cruelty in suppressing an insurrection in Thessalonica, in which 7,000 people were ruthlessly murdered by his soldiers in an amphitheater. Though a Christian, he was refused communion by St. Ambrose on account of this crime until he had been humiliated for eight months. The empire passed to his two sons at his death, Honorius receiving the western portion and Arcadius the eastern.

Theology (*thê-ô-l'ô-jî*), a term employed by classical authors to describe treatises on the nature and worship of the gods, such as Hesiod's "Works and Days" and Cicero's "Natura Deorum." It is now applied to the science which treats of God and the relations of God and man, and has special reference to the present condition and ultimate destiny of mankind. The two generally recognized divisions are *natural*, or *philosophical*, theology, which seeks a knowledge of God through the light of nature and reason, and *positive*, or *revealed*, theology, which embraces and systematizes the doctrines contained in the various

books of the Bible. The theologies of all Christian churches are based chiefly on the New Testament. The earliest interpretation of the New Testament doctrines was made by the Apostolic Fathers, and later by the so-called Fathers of the Church. Doctrines were stated primarily in general terms and subsequently they were expounded by theologians, but ultimately clear and precise form was given to them by decisions promulgated through councils. *Protestant theology* had its beginning with Luther and Zwingli, who asserted their right to interpret Scripture by private judgment. On the other hand, the theology of the Roman Catholic Church is founded on the consensus of the Fathers, on council decisions, and opinions promoted by the pontiffs.

Theophrastus (*thê-ô-frăs'tūs*), Greek philosopher, born in Lesbos in 370 B.C.; died in 287 B.C.; famous as the most important disciple of both Plato and Aristotle. As such, he succeeded Aristotle as the recognized leader of the Peripatetic school (*q.v.*). Of his allegedly more than 200



THEOPHRASTUS

writings, only fragments, such as "Ethic Characters," remain. They deal with dialectic, ethical, and metaphysical problems but also with questions of natural science. Obviously, he was not an independent thinker, but more the apostle of Aristotle, for whose ideas he fought against the followers of the Stoa (*q.v.*).

Theorem (*thê-ô-rēm*), in mathematics, a proposition which is to be proved. All conclusions in mathematics are expressible as propositions. Those which are accepted without proof are called axioms or postulates. Those which can be proved deductively from the axioms and postulates are called Theorems.

Theosophy (*thê-ôs'ô-fy*), a term applied to a so-called sacred science. It differs from the science of philosophy and theology in that it professedly derives its knowledge of God from immediate communications with the Deity, and in this respect could be considered as a branch of mysticism (*q.v.*). In contrast to theology, theosophy deals not only with the relation of the soul

to God and with definitions of the idea of God, but with the influence of God on the human soul.

Theosophy dates from remote antiquity, actually, *e.g.*, from the various systems of the Neo-Platonists. It is also indebted to later mystics, Jakob Böhme and Emanuel Swedenborg (*qq.v.*). The term is particularly applied, however, to the concept of Helena P. Blavatsky (*q.v.*), which she developed in the book "The Secret Doctrine." With the help of Col. Henry S. Olcott (editor of the *Theosophist*, 1879-1907) and others, she founded the Theosophical Society in New York City in 1875. Annie Besant of England, a militant fighter for Indian nationalism and other causes, became one of the leaders of the movement, calling her special concepts "ancient wisdom." Oriental, especially Indian, thought was fused with the ideas of the earlier German mystics, including those of Böhme, Meister Eckhart, and Franz von Baader (*qq.v.*). She borrowed ideas from divers sources—from Frederick W. Schelling and even the Cabala (*qq.v.*). Modern theosophy, in its development of earlier mystical ideas, believes in the unity of reality to be recognized by an ideal universal brotherhood of man. "The one life," the ultimate oneness, must be experienced.

The theosophists teach that man possesses elements of essential divinity, but that the underlying principle of all manifestation is infinite and eternal and may be known through its spiritual and material manifestations. Throughout the universe, embracing the physical, mental, psychic, and moral planes, runs a unity of consciousness and a unity of law. Thus there exists only one reality within which all existences are contained and develop in a cyclic process. Therefore the symbol of reality for the theosophists is the wheel. Man can be helped through the secret divine wisdom to discipline and purge himself to ever higher planes. Some of the leading supporters of this system of thought hold that the divine principle manifests itself through occult phenomena, in which respect their tenets are somewhat allied to spiritism (*q.v.*). Theosophy in essence represents an attempt to blend Western with Eastern religious thought. The Theosophical Society was merged (1898) into the Universal Brotherhood movement of Point Loma, Calif., by Katharine A. Tingley, a spiritualist medium, who had gained much influence among Theosophists and who remained active in establishing Theosophist organizations in many parts of the world until her death in 1929. She taught her followers to study ancient and modern religions, philosophy, art, science, the divine power in man, and the law of nature.

In the U.S. today, the Theosophical Society in America maintains headquarters near Wheaton, Ill., and publishes a monthly magazine, *The*

American Theosophist. Local branches exist throughout the U.S. and Canada, with a membership of a few thousand. Affiliated organizations are in existence in many of the countries of Europe.

A sideline of theosophy is the *anthroposophical* movement founded by the Hungarian Rudolf Steiner (1861-1925). He intellectualized the theosophical movement and tried to connect it with new styles of dancing, figurative art, and architecture, an enterprise which led many of his followers to very amateurish productions. He recommended specific exercises for meditation, borrowed from the East, believing that in this way deeper and surer knowledge could be gained. He believed in reincarnation (*q.v.*), depending on the degree of knowledge acquired in the earlier life.

Therapeutae (*thēr-ā-pū'tē*), an ascetic sect among the ancient Jews, sometimes closely associated with the Essenes. They had their seat near Alexandria, in Egypt, and were ardent students of the law of Moses. In their religious work they were secluded, spending much of the time in meditation. They are described in a treatise by Philo, who credits them with observing the Sabbath and other Jewish festivals.

Therapeutics (*thēr-ā-pū'tiks*), the branch of medicine which treats of the action of drugs and other remedies upon the diseased system, or the means that may be used in assisting nature to restore health. It embraces a knowledge of the nature of diseases and the drugs or curative agents to be employed in treating them. Such knowledge is obtained by experimental investigation on animals as well as man. The subject has been divided into *rational therapeutics* and *natural therapeutics*, the former having reference to the action of drugs as curative agents and the latter proposing to cure disease through natural laws. In the former the physician aims to apply remedies for their specific effect, while in the latter he supports the strength of the patient by administering food as a part of the mode of treatment. The term *electro-therapeutics* has come into use through the application of electricity in medicine. Where a physician attempts to treat the symptoms rather than the causes, the practice is said to be *symptomatic therapeutics*. Any remedy that is known to cure a disease, as quinine in the treatment of malaria, is termed a *specific*. See also *Allopathy*; *Homeopathy*.

Theresa (*tē-rē'sā*) or TERESA, two saints of the Roman Catholic Church. See *Teresa*.

Thermae (*thēr'mī*), or HOT SPRINGS, the name applied to any spring whose mean annual temperatures are higher than those of the localities where they are located. Hot springs range from some found in localities of a cold climate, whose temperature may be a few degrees higher than

the freezing point, to those whose waters are heated to the boiling point. Such springs are caused by the interior heat of the earth. They usually occur in volcanic regions, where the water flows through a portion of the earth's crust that is highly heated. Where these springs are found in districts that are not subject to volcanic eruptions, at least not in recent geological times, their cause may be assigned to the heating influences of gaseous emanations from the interior of the earth. Many hot springs have medicinal properties, while others yield minerals of value, such as sulfur, salt, or magnesia.

Thermit (*thēr'mīt*), or THERMITE, a mixture of aluminum powder and ferric oxide. It is used in welding and in the manufacture of incendiary bombs. When thermit is ignited by suitable means, such as by burning magnesium, a rapid reaction occurs with the evolution of much heat, reaching a temperature between 3,000 and 3500° C. If this is done in a crucible, the iron which is produced settles to the bottom and the molten aluminum oxide floats on top. When this molten iron is poured between heated pieces of steel, such as rails, a perfect joint is produced. This principle has been applied to the production of other metals through the reduction of the oxides by aluminum.

Thermodynamics (*thēr-mô-dī-nām'iks*), the branch of physical science which treats of the relationship of heat and mechanical energy. The subject of thermodynamics is based upon two laws, which state: (1) the equivalence of heat and other forms of energy and (2) the limitations upon the transformation of heat into other forms of energy. Thermodynamics is very important in the design of heat engines and refrigerating devices.

Thermoelectricity (*thēr-mô-ē-lēk-trīs'i-tē*), the branch of electrical science which treats of the properties and action of electricity developed by heat. If two bars of unlike metals, such as antimony and bismuth, or copper and iron, are soldered together at one end, the other end being connected by a conductor and heat being applied, an electromotive force will be produced and a current of electricity will flow in a predictable direction through the circuit so provided. A current of electricity will likewise be produced if the soldered end be cooled, but it will flow in an opposite direction. In practice, the face of the pile, as a number of thermoelectric couples thus formed are called, is turned toward the source of heat, such as a polarized beam from an electric lantern. A galvanometer is then placed in the circuit of the pile and equilibrated. Any increase or diminution of the temperature in the beam is at once shown by the movement of the galvanometer needle. Currents of electricity produced by a thermopile, or battery, will continue to flow

as long as there is any difference of temperature between the opposite ends of the bar. While a single couple, or cell, as the simple arrangement is called, will produce a weak electric current, considerable force may be developed by a thermoelectric pile, or battery.

Thermograph (*thēr'mô-grāf*), an instrument for automatically recording variations of temperature. It consists essentially of some form of metallic thermometer, to which is attached a circular disk of paper, and a pen is so connected that it moves vertically over the surface of the sheet. In most instruments the sheet of paper is drawn horizontally by clockwork so attached that it makes a complete revolution in 24 hours. The surface of the paper disk is graduated into spaces indicating minutes and hours, and degrees of temperature are shown in the spaces set off by concentric circles. Since the disk makes a complete circuit in a day, it is possible to read off the temperature at any given time. By replacing the disk daily and filing it for reference, a complete record of the temperature for a series of days may be preserved.

Thermoluminescence (*thēr-mô-lū-mīn-ēs-gns*). See *Phosphorescence*.

Thermometer (*thēr-môm'ê-tēr*), from Greek "heat measurer," a device for measuring temperature (intensity of heat). Thermometers may be classified as *mechanical*, which are based on the regular expansion or contraction of various substances with changing temperatures; *electrical*, which depend on the fact that the electrical resistance of certain metals varies with temperature or that dissimilar metals in contact with one another produce an electric current proportional to the temperature; and *optical*, which measure very high temperatures by a process involving a determination of the brightness or color of very hot bodies. These classes of thermometers are so different that they require separate discussion.

Mechanical thermometers employ a liquid or gas whose volume changes in a regular way as temperatures vary. The commonest variety employs liquid mercury in a glass tube. The internal bore of the tube is very narrow (capillary) and communicates with a small bulb sealed on one end, the other end being closed. The bulb contains mercury and the capillary, which has the same diameter throughout, is a partial vacuum having only a small, invisible amount of mercury vapor in it. When the temperature of the bulb is increased, the mercury flows into the capillary; when the temperature is lowered, it recedes. The length of the column is directly proportional to the temperature of the bulb. For convenience in measuring the length of the mercury column, a scale consisting of equally spaced divisions, called degrees, is etched on the glass tube or marked on a supporting plate to which the tube is

permanently fastened. The scale is graduated by assigning definite values to the freezing and boiling temperatures of water. The several scales in common use assign different values to these points. G.D. *Fahrenheit* (*q.v.*) assigned a value of 32° to the freezing point of water, 212° to its boiling point, and divided the scale between these two points into 180 equal divisions. The reason for these particular numbers is unknown, but it is believed that he chose the lowest temperature known to him (temperature of a mixture of snow and salt) as 0° on his scale to avoid negative temperatures. This scale is in general use throughout the English-speaking world. A French physicist, René de *Réaumur* (*q.v.*), devised a scale in popular use in France by assigning a value of 0° to the freezing point of pure water and 80° to its boiling point; thus there are 80 degrees between the freezing and boiling points of water. The *Centigrade* scale, in use throughout the scientific world, was devised by Professor A. Celsius, of Upsala, Sweden. On this scale, the boiling point of water is 100° , its freezing point 0° , and the distance between these two is divided into 100 equal parts. Degrees above zero on all these scales are called + degrees, those below are - degrees. On the *Absolute* or *Kelvin* scale (proposed by Lord Kelvin), however, there are only positive values. This scale is based on the fact that a gas, behaving ideally, will change by approximately $1/273$ (actually $1/273.13$) of its volume at 0° C. Thus a volume of a gas if decreased in temperature to -273.13° C. should theoretically vanish. This temperature is 0° K. and the freezing and boiling points of water are 273.13° K. and 373.13° K. respectively. The size of the degree is the same on the Centigrade and Kelvin or Absolute scales and the relations between these various scales may be expressed by the equation:

$$^{\circ}\text{K.} = ^{\circ}\text{C.} + 273$$

$$^{\circ}\text{F.} = 9/5^{\circ}\text{C.} + 32 = 9/4^{\circ}\text{R.} + 32$$

$$^{\circ}\text{C.} = 5/9 (^{\circ}\text{F.} - 32) = 5/4^{\circ}\text{R.}$$

C.=Centigrade. F.=Fahrenheit. R.=Réaumur.

When the Kelvin scale is expressed in Fahrenheit degrees, it is called the *Rankine* (Ra) scale. Thus $-460^{\circ}\text{F.} = 0^{\circ}\text{Ra}$, $0^{\circ}\text{F.} = 460^{\circ}\text{Ra}$.

Mercury thermometers are employed between -38°C. and 540°C. , and other liquids are used to extend this range. Pentane is used from -180°C. to 20°C. , thallium amalgam from -60°C. to 100°C. , and gallium in quartz from 31°C. to $1,000^{\circ}\text{C.}$ The latter was employed by the Germans during World War II. To attain higher temperature measurements, electrical or optical thermometers must be used.

Electrical thermometers of the resistance type are based on the fact that the resistance of nickel and platinum wires increases with increasing temperature. The nickel thermometers are usually employed over the range from -180°C. to 120°C.

C. and platinum from -180° C. to $1,000^{\circ}$ C. Absolute temperatures measured in this way are not accurate to more than 0.01° but differential measurements are much more accurate.

In the thermocouple type of electric thermometer two dissimilar metals are placed in contact. The electric current generated from this junction is proportional to its temperature. The wires making up the junction are blackened to absorb all radiant energy falling on them and very sensitive electrical apparatus is used in measuring the small currents generated. Such thermocouples are used for measuring temperatures as high as $1,600^{\circ}$ C.

Optical thermometers, usually called *optical pyrometers*, are used to measure temperatures from 600° C. to $2,000^{\circ}$ C. The principle depends on the fact that certain colors and degrees of brightness depend on the temperature. For example: incipient red heat occurs at 500° C. to 600° C., dark red at 600° C. to 800° C., and bright red at 800 - $1,000^{\circ}$ C. The eye cannot measure absolute brightness with accuracy but the brightness of two bodies can be compared satisfactorily. In the examination of brightness from an incandescent body one method involves matching the brightness with that of a heated filament whose color temperature is known.

The exceedingly high temperatures of stellar bodies (surface $23,000^{\circ}$ C., interior $40,000,000^{\circ}$ C.) are not measured but are calculated on the basis of known laws of radiation.

Thermopylae (*thēr-mōp'ē-lē*), or PYLAE, a famous pass mentioned in ancient history, the only one through which an invading army may pass from northern into southern Greece. It is situated south of the Sperchius River, forming a narrow passway between Mt. Oeta and the Maliac Gulf. In its course are several hot springs, hence the name Thermopylae, meaning the Hot Gates. The Spartan king, Leonidas, made the pass famous in history by attempting to prevent the mighty Persian army under Xerxes, in 400 B.C., from overrunning southern Greece and capturing Sparta. His army numbered 7,000, but he selected a band of 300 Spartans to make a gallant stand against the invaders, who had been informed of the pass by a Thessalian. The defile was pointed out in the same way by a traitor to the Gauls under Brennus, who, in 279 B.C., forced the Greeks to retire. The pass has become widened by natural causes into a swampy plain, and is now of little importance as a strategic point.

Thermostat (*thēr'mō-stāt*), an automatic device used for regulating the temperature of a heating furnace. It depends upon the expansion and contraction of solids, liquids or gases, these properties being employed to open or close a damper, thus increasing or diminishing the draft of air upon the burning fuel. In gas and oil furnaces it may also increase or diminish the flow

of fuel supplied. Thermostats are used for various other purposes, such as regulating the flow of oil, gas, water, electricity, etc., the purpose in most cases being to maintain uniformity of consumption. An increasingly important use is also to control or adjust the operation of mechanical refrigeration and air-conditioning plants.

Theseum (*thē-sē'ūm*), the name given by the Greeks to any building dedicated to Theseus. The largest and most celebrated temple sacred to him was located at Athens and appears to have occupied a site not far from the Acropolis. It was built about 473 B.C., when the remains of Theseus were removed from the island of Scyros to be entombed at Athens.

Theseus (*thē'sūs*), in Greek legend, a famous king of Athens, son of King Aegeus and his queen Aethra. Theseus was educated by his grandfather, Pittheus, and was recognized when he found the sword of his father, which Aegeus had concealed under a rock as a means of recognizing his son. When he returned to the court of Aegeus in Athens, his stepmother, Medea, tried to poison him, but unsuccessfully. Theseus' most famous exploit was that of slaying the Minotaur (*q.v.*), thus freeing Athens from the obligation of sending annually seven youths and seven maidens to be devoured by the Cretan monster. Ariadne, daughter of King Minos of Crete, became enamored of Theseus, gave him a sword to kill the monster, and provided a thread with which he could escape from the labyrinth. On leaving Athens he promised that he would display white sails on his return if he had succeeded in his enterprise, but forgot his pledge and the ship returned with its usual black sails. His father, seeing black instead of white, immediately hurled himself into the sea.

This legend represents allegorically historical events, of the struggles of the earliest Greeks, who had invaded Greece from the north, against the superior Cretan civilization. Thus they fought against the Cretans, finally successfully. The labyrinth perhaps represents merely the palace of the Cretan king, Minos, which had been erected around 1600 B.C. The complicated construction of this palace must have been confusing to the more primitive Greeks, who were accustomed to living in one-room houses.

After Theseus ascended the throne of Athens, he conducted successful wars against the Amazons and the Centaurs and reorganized the Athenian festival. His government is described as one of mildness and popularity. He married Phaedra, sister of Ariadne. However, she fell in love with Hippolytus, the son of Theseus and Antiope, but, as the youth did not return her feelings of affection, she accused him wrongfully to his father. In a fit of anger Theseus implored Neptune to destroy him, and after his death Phaedra



THESEUS BROUGHT BEFORE AMPHITRITE

From a Greek vase painting

hanged herself in remorse. Sophocles and Euripides made the story of Phaedra the subject of a tragedy.

Theseus carried Helen from Sparta to Athens, which caused Castor and Pollux to imprison him in the underworld, and in his absence the Athenians revolted. He was finally killed on the island of Scyros by King Lycomedes, but his body was returned to Athens about 469 B.C. and was placed in the famous temple called *Theseum*. This temple served as a sanctuary for the poor and was a retreat for slaves when they were treated cruelly. The Greeks had a tradition that Theseus came from the spirit world and fought on the side of the Athenians in the Battle of Marathon.

Thespis (*thēs'pīs*), Greek tragic poet, born in Scaria, Attica, in the 6th century. According to tradition, he became the inventor of tragedy by adding to the old dithyrambic chorus a single actor who conversed with the leader of the chorus. See also *Drama*.

Thessalonians (*thēs-ā-lō'nī-anz*), EPISTLES TO THE, two books of the New Testament, addressed by St. Paul to the church at Thessalonica. The first of these books was probably the earliest of all the epistles written by St. Paul and may have been prepared while he was at Corinth, when Silas and Timothy had returned from Macedonia, about the year 52. It may be divided into two parts, one referring to the condition of religious work among the people to whom it is addressed, and the other instructing them in Christian duties and the fate of the dead at the expected return of Christ. The second epistle was written about one or two years later, and aims to correct some mistaken ideas respecting the coming of Christ. Paul commends the Thessalonians for their patience and faith in their persecutions, and refers to the coming of the Antichrist prior to the re-

turn of Christ himself as expected in Christian faith.

Thessalonica (*thēs-ā-lō-nī'ka*), a former name of Salonika (*q.v.*). Originally called Therma, the city was rebuilt and renamed Thessalonica by the Macedonian king Cassander in the 4th century B.C. It was prominent among cities during the early Christian era, and St. Paul addressed two of his epistles to the Christians at Thessalonica. See also *Thessalonians*.

Thessalonike (*thā-sū-lō-nyē'kyē*) or THESSALONIKI, a department (area, 1,326 sq. m.) of northeastern Greece. Thessalonike is also the Greek name for the city of Salonika (*q.v.*). Population of the department, 1951, 459,956.

Thessaly (*thēs'ā-lī*), a region in eastern Greece, comprising the modern departments of Larissa, Trikkala, Kardhitsa, and Magnesia. Its limits are naturally defined by the Cambunian Mts. on the n., the Pindus Mts. on the w., the Othrys Mts. on the s., and the Aegean Sea on the e. It is drained by the Salambria (once known as the Pencios) River. With some of the most level and fertile land in Greece, it was historically noted for agriculture and horse breeding. In ancient times, invaders from Epirus to the west became its ruling class. Under them, the region became a loose confederacy of four states. Never politically dominant in Greek history, Thessaly fell successively to the Macedonians, the Roman and Byzantine empires, and the Turks. The territory was ceded to Greece by the Turks in 1881.

Thetis (*thē'tīs*), in Greek legends, the daughter of Nereus and Doris, the wife of Peleus, the mother of Achilles. Her marriage to Peleus was desired by the gods, who had predicted that her son would be greater than his father. The wedding was attended by all the gods except Eris, who became angered and as a revenge threw the apple of discord among the guests.

Theuriet (*tē-ryā'*), ANDRÉ, poet and novelist, born at Marly-le-Roi, France, Oct. 8, 1833; died in Bourg-la-Reine, April 23, 1907. He studied law in Paris, was admitted to practice in 1857, and soon after entered the ministry of finance, although he devoted much of his time to writing. He was elected to the French Acad. in 1896. His chief work of poetry is "*Chemin des bois*" (1867), and his noteworthy novels include "*Reine des bois*" and "*La maison des deux Barbeaux*." His writings are characterized by poetic descriptions of country life.

Thévenin (*tāu-nān*), DENIS. See *Duhamel, Georges*.

Thiamine (*thī'à-mēn*). See *Vitamins*.

Thian Shan (*tyān' shān*), or TIEN SHAN, an elevated mountain system of Central Asia, which is situated in Western China and extends into

Turkestan. It runs some 1,500 m. from east to west and contains many peaks towering 10,000 to 21,000 ft. above sea level. The loftiest summit is Tengri-Tagh, 21,215 ft. Spurs of the Thian Shan Mts. penetrate into the Desert of Gobi. Many of their summits extend above the snow-line, but the slopes are well timbered.

Thibet (*tî-bê't*), See *Tibet*.

Thiers (*tyâr*), LOUIS ADOLPHE, statesman and historian, born in Marseilles, France, April 15, 1797; died near Paris, Sept. 3, 1877. After studying law, he turned to journalism, becoming a contributor and part owner of the Parisian newspaper, *Constitutionnel*. In 1823-27 he wrote his ten-volume "History of the French Revolution," which established his literary and political reputation. A cofounder of the liberal newspaper, *National*, he was a leader of the 1830 revolution and an influential member of the Chamber of Deputies.

Appointed minister of the interior in 1832, Thiers served in various official capacities (including those of foreign minister and president of the council) under Louis Philippe (*q.v.*). However, his policies—particularly of interventionism in foreign affairs—often clashed with those of the king and caused him to stay out of government in 1836-40 and resign after six months in 1840. For the next two decades, while Louis Philippe fell and Louis Napoleon (*q.v.*) gained power, Thiers played only a minor rôle in politics and devoted his attention to writing a 20-volume "History of Consulate and Empire" (1845-61). In 1863 he again became a member of the Chamber of Deputies and opposed, without success, the declaration of war against Germany in 1870. After the defeat of France and the collapse of the empire of Napoleon III, Thiers was given executive power and responsibility for negotiating peace with Germany. Appointed president of the new Third Republic in 1871, Thiers resigned in 1873 before his term was completed.

Third Degree (*thîrd dê-grê'*). See *Torture*.

Third Force (*thîrd fôrs*), the term used for a time to refer to the coalition of French political parties of the Center which developed in 1947 in opposition to the Gaullists on the Right and the Communists on the Left. The principal parties involved in this coalition were the Socialists, the Radicals, and the M.R.P. (Popular Republican Movement). With support from several minor parties, this "third force" group organized the various governments of the Fourth Republic.

Third International (*thîrd in-têr-nâsh'ûn-âl*), also called the *Communist International* or *Comintern*, formed by Lenin, Trotsky, and other Russian leaders at Moscow in 1919. It adhered to the doctrines of Karl Marx (*q.v.*) and the First International, in that it advocated the use of force in overthrowing capitalism. Its headquarters were in Moscow, and its membership included Com-

munist parties in several nations. By reason of its desire for world-wide revolution, the Comintern made enemies abroad and lost many of its adherents in democratic countries following the Russo-German non-aggression pact of Aug. 24, 1939. Following a recommendation of the executive committee of the Comintern, the Third International was dissolved in May 1943. See *Communism*; *International*.

Third Reich (*thîrd rîk*). See *Germany*.

Third Republic (*thîrd rê-pûb'lik*), the name given to the government of France after the destruction of the empire of Napoleon III in 1871. In the opinion of some writers, the Third Republic ended with the fall of France in 1940. Although the Vichy government, which then took over, was considered an official government, the Fourth Republic was not inaugurated until Jan. 16, 1947, with the adoption of a new constitution. See *France*, *HISTORY*.

Thirlwall (*thêrl'wal*), CONNOP, historian and theologian, born in London, England, Jan. 11, 1797; died July 27, 1875. He studied at Trinity Coll., Cambridge, where he became a fellow and tutor after his graduation in 1818. Subsequently he studied law and was called to the bar. In 1828, he took orders in the Church of England. He was made rector of Kirby Underdale, Yorkshire, and soon began to give attention to literary work. In 1840, he was made bishop of St. David's, in Wales, where he conducted services in the Welsh tongue. His chief historical work is "The History of Greece," in eight volumes. He made a translation of Schleiermacher's "Critical Essay on the Gospel of St. Luke" and Niebuhr's "History of Rome." His fine "Letter to a Friend" was edited by Dean Stanley.

Thirst (*thîrst*), the sensation caused by the need of water in the body, which is relieved by drinking. It is accompanied by febrile excitement and usually by excessive heat, and is followed by a sensation of fatigue and weakness. The excessive use of salt is a familiar cause of thirst; the presence of too much salinity in the blood calls for added water to reduce the salt content. Some diseases, such as diabetes and cholera, are accompanied by great thirst. The craving for water while in a state of thirst is explained by a reduction in volume of the fluids of the body, and these are more saline under such a condition. Relief may be obtained not only by drinking water, but also by injecting fluids into the veins. Drinks that contain a small quantity of acid are most effective in relieving thirst, since they stimulate the action of the salivary glands.

Thirteen Original Colonies (*thîr'tên ô-rîj'-î-nâl kôl'ô-nêz*), the colonies established and governed by Great Britain between 1619 and 1776 within the present territory of the U.S. Delegates from the 13 colonies adopted the Declaration of

THIRTY TYRANTS

Independence in 1776, and, after winning the War for Independence, established themselves as the 13 original states within the federation known as the United States of America. The names of the colonies, which were retained by the states, were: Connecticut, Delaware, Georgia, Maryland, Massachusetts, New Hampshire, New Jersey, New York, North Carolina, Pennsylvania, Rhode Island, South Carolina, Virginia.

Thirty Tyrants (*thīr'ty tī'rants*), the name of a body of rulers in Athens, who were chosen as magistrates after the close of the Peloponnesian War, in 404 B.C. They were native Athenians of the aristocratic party, and were chosen by the conquering Spartans with the hope that their government would prove unpopular to the democracy. These rulers were cruel and oppressive in their official acts and after one year they were expelled under Thrasybulus, who had been exiled by them. As a result of the Battle of Piraeus, in which he commanded, the democratic form of government was restored to Athens.

Thirty Years' War (*thīr'ty yērz wār*), the name of a conflict in Central Europe, whose seat was chiefly in Germany. It was a struggle between the Protestants and Roman Catholics for supremacy, and extended from 1618 until 1648. The Treaty of Augsburg, concluded in 1555, had virtually ended the Reformation, and by its terms each of the states was permitted to choose its national religion. It had been planned to provide regulations under which each state might have uniform religious interests, and so all subjects were permitted to remove to states where their faith was sanctioned officially, but the inconveniences of removals overcame the desire for settling elsewhere than in the states to which the parties interested were subject. Differences in questions of government soon arose, and the growing strength of Protestantism in Bohemia and Austria caused a reaction to set in under the influence of the Jesuits. As a means of mutual protection, the Evangelical Union was organized by the Protestants in 1608, and the Catholic League, or Holy League, was formed the following year. Ferdinand of Styria, who had been educated by the Jesuits, became King of Bohemia in 1617. He immediately showed favors to the Catholics and caused many of the Protestant churches to be closed. In 1618, the Protestant estates petitioned Emperor Matthias of Austria for relief, but that monarch declared their meeting illegal.

The Protestants, under the leadership of the Count of Thurn, on May 23, 1618, expelled two representatives of the emperor from the royal palace at Prague. This action was taken as a protest against the infringement of the crown against religious liberty and was the immediate occasion of the beginning of the war. Both Protestants and Catholics took up arms in defense of



FIRST CLASH OF THE THIRTY YEARS' WAR

Defenestration of the two representatives of the emperor from the royal palace in Prague, 1618



Courtesy Brown Bros., N. Y.

THIRTY YEARS' WAR

Gustavus Adolphus at the Battle of Lützen, 1632

their faith. The concessions to Protestants in Bohemia were withdrawn by the authorities, and this act was immediately followed by an uprising. In 1619, the Protestants chose Frederick V, the Palatine elector, as King of Bohemia. The Catholic forces were repeatedly defeated by Count Thurn, but Maximilian of Bavaria defeated him at Weissemburg in 1620. An army of Spaniards under Spinola came to the relief of the Catholics, and the defeat of the Protestants upon the field was followed by persecution.

The seat of war was carried farther west immediately after the Protestant losses in Bohemia and for some time had its center in the Palatinate. The Protestant forces under Count Mansfeld were successful in holding their position on the Rhine, where they retaliated in 1621 for the tyranny shown by Ferdinand II of Austria, formerly King of Bohemia. However, Tilly, the imperial com-

mander, gained a victory at Wimpfen, in 1622, and the following year defeated the Protestants at Höchst and Stadtlohn. The war would likely have ended with these victories, but the Protestant princes in the north, fearing the growth of Catholic influence in the southern part of Germany, became aroused.

Christian IV, King of Denmark, joined the Protestant cause in 1624. He was supported by Holland and a British subsidy. His forces joined those of Mansfeld and Christian of Brunswick, and these forces took strong positions in Lower Saxony. Emperor Ferdinand was supported by two noted commanders, Wallenstein, the commander of the imperial army, and Tilly, the leader of the Holy League. In 1626, the Danes were defeated at Lutter by Tilly and at Dessau by Wallenstein. They overran Denmark and the northern part of Germany and Christian IV was compelled to sign a treaty of peace at Lübeck in 1629. In the meantime Mansfeld gathered a powerful army and conducted a vigorous campaign in Moravia and Hungary.

The Swedish-German period of the war began in 1630, when Gustavus Adolphus, King of Sweden, came with a powerful army into Germany as a support to Protestantism. Ferdinand of Austria had previously ordered the restitution of certain estates to the Catholic church, an edict that was unpopular among many Catholics and an offense to the Protestants. The Swedish army landed at Peenemünde and drove the imperialists out of Mecklenburg and Pomerania, and the Swedish king concluded alliances with a number of German states, including Hesse, Brandenburg, and Saxony. Tilly captured Magdeburg in 1631 and permitted the city to be plundered and many of the inhabitants to be slaughtered. The armies met near Leipzig, at Breitenfeld, where Tilly was defeated with great loss. Gustavus followed up his victory by advancing toward the south and east, and defeated his enemy on the Lech, in 1632, where Tilly was slain. His plan of campaign included the establishment of powerful organizations as a support to his cause, and Sweden soon became the head of the Evangelical Union. Wallenstein had been previously disgraced, but Ferdinand now recalled him as a means of checking the powerful advance of the Protestants. He promptly invaded Saxony, where the armies met on the field of Lützen, in 1632. While Wallenstein was signally defeated, the Protestants sustained an irreparable loss in the death of Gustavus Adolphus, who was slain at the moment of victory. Oxenstiern now succeeded to the command of the Swedish army and sustained the advantages gained until 1634, when the Protestants under Bernard of Weimar were defeated at Nördlingen.

The French-Swedish period of the war began

in 1636, when Richelieu joined the Protestant forces to defeat the ambitions of Austria. France thus became united with Sweden and Richelieu was given general direction of the war, but the conquest now became political rather than religious, and Denmark and Saxony united with Austria. Northern Germany was held by the Swedes under Banér, who defeated an army of Saxons and Austrians at Wittstock in 1636. Later the same army gained victories at Breitenfeld in 1642 and at Jankau in 1645. Another army under Condé and Turenne gained repeated victories in the regions of the Rhine and forced the opposing army to leave the Palatinate and Bavaria. It was planned to conduct a general invasion of Austria, but the different governments had been endeavoring to bring the war to a close, which was finally accomplished in 1648 by the Treaty of Westphalia. Protestantism was saved by the most terrible war up to that time, but at a cost that is astounding. Many provinces of Germany were devastated and the population was greatly decreased. From the effect of this contest Germany recovered only after a period of two centuries. See also *Reformation*.

Thistle (*this'*l), an extensive genus of plants of the aster family. Some of these plants are troublesome weeds in many sections of Canada and the U.S., where about 30 species have been described. They have prickly leaves and tubular flowers in a hairy receptacle. A tuft of hairs surmounts the seeds. Some species bear beautiful flowers, but the plants are looked upon as obnoxious, owing to their roots being too deeply seated to be plowed up, and because small particles broken from the parent stalk grow and produce new plants. The *Canadian thistle* is one of the most troublesome. It appears early in the spring, growing from the perennial rootstock, but the growth is most rapid in midsummer. Many states and provinces have enacted laws requiring owners of land to uproot and destroy it. The *Scotch thistle*, *pasture thistle*, *milk thistle*, *carline thistle*, and *cotton thistle* are other species that are widely distributed.

The thistle was adopted as the national emblem of Scotland in the reign of James III. Coins of that country formerly bore the Latin motto, *Nemo me impune lacessit*, meaning "no one touches me with impunity." James VII of Scotland instituted the Order of the Thistle in 1687. It fell into abeyance during the reign of William and Mary, but was revived in 1703 by Queen Anne and is now the fourth highest award bestowed by the crown. When a person receives the Order of the Thistle, he automatically becomes a knight.

Thistle, ORDER OF THE. See *Thistle*.

Thoma (*tō'mä*), HANS, painter and illustrator, born at Bernau, Germany, in 1839; died Nov. 7,

1924. He studied art at the Karlsruhe Acad., at Düsseldorf, and in Paris where he was especially interested in Courbet's landscape painting. During the following years, spent in Munich and Italy, he devoted his studies especially to the old masters of the 15th century as well as to Marées and Boecklin, whose influence is to be felt in his work. In 1899, he became principal of the academy and gallery at Karlsruhe. Besides producing many portraits and landscape paintings, he treated religious and allegorical subjects and did considerable work in illustrating and lithographing. His art is characterized by sincere observation, honest feeling, deep devotion to nature, all in harmonized composition. His colors are deep and warm, and he masterfully caught the landscape of his home region, the Black Forest. Among his chief paintings are: "The Open Valley," "The Keeper of the Garden of Love," "Landscape with Children," "A Taunus Landscape," "Self-Portrait with Death," and "The Village Fiddler."

Thomas a Kempis (*tõm'as a kēm'pīs*). See *Kempis*.

Thomas (*tõ-mā'*), (CHARLES LOUIS) AMBROISE, composer, born in Metz, France, Aug. 5, 1811; died in Paris, Feb. 12, 1896. Trained by some of the best music teachers of his time, he studied at the Paris Conservatory, where he became a teacher of composition in 1852 and director of the institution in 1871. Winner (for a cantata, "Herman et Ketty") of the Grand Prix de Rome in 1832, he composed a number of ballets and many operas, including "Mignon" (1866), a musically charming and internationally popular work based on Goethe's story of "Wilhelm Meister."

Thomas Aquinas (*tõm'as a-kwī'nas*). See *Aquinas*, *Thomas*.

Thomas (*tõm'as*), DYLAN MARLAIS, poet, born in Carmarthenshire, Wales, Oct. 27, 1914; died in New York City, Nov. 19, 1953. His formal education ended with grammar school, and his first book, "Eighteen Poems," was published in his 20th year. Among his works are the volumes of poetry "Deaths and Entrances" (1946) and "In Country Sleep" (1951), as well as a collection of stories and autobiographical sketches, "Portrait of the Artist as a Young Dog" (1940); a number of other prose works, including "Adventures in the Skin Trade, and Other Stories" (1955); a motion-picture script, "The Doctor and the Devils" (1953), and a poetic drama, "Under Milk Wood" (1954). Considered by many to be one of the great contemporary poets, his work is distinguished by vividness of language and symbolism and introspectiveness of mood. Some of his most memorable poems, such as "Fern Hill," are impressions of childhood.

Thomas, ELBERT DUNCAN, public official, born in Salt Lake City, Utah, June 17, 1883;

died in Honolulu, Hawaii, Feb. 11, 1953. Educated at the universities of Utah and California, he went to Japan as a Mormon missionary (1907-12). Upon his return, he taught Latin and Greek at the Univ. of Utah (1914-16). In 1924 he became professor of political science there. He was elected to the U.S. Senate on the Democratic ticket in 1932 and was re-elected in 1938 and 1944. Thomas was co-author of the bill creating the Civilian Conservation Corps and, before World War II, was chief formulator of the no-strike plan under which the War Labor Board was later set up. He was one of the leaders in the fight to change the Neutrality Act of 1935 to make it less prejudicial toward non-aggressors. He served as U.S. delegate to the International Labor Organization conferences, 1944-45, and wrote "Chinese Political Thought" (1927), "Thomas Jefferson—World Citizen" (1942), and "This Nation Under God" (1950).

Thomas, GEORGE HENRY, soldier, born in Southampton County, Virginia, July 31, 1816; died in San Francisco, Cal., Mar. 28, 1870. After his graduation from the West Point Military Acad., in 1840, he was commissioned as a lieutenant and sent against the Seminole Indians in Florida. Subsequently he served in California and Texas, and in the Mexican War in the Battles of Monterrey and Buena Vista. He remained in the Southwest until 1849, when he went to Florida for two years' service, and in 1851 became instructor at West Point. At the beginning of the Civil War he was assigned to a division in the Army of the Ohio, but was soon transferred to the Army of the Cumberland, with which he fought in Alabama, Kentucky, and Tennessee. In 1862, he took part in the Shiloh campaign and in the Battle of Stone River, and the following year became brigadier general with command of the Army of the Cumberland.

For his part in the Battle of Chickamauga, Thomas became known as the "Rock of Chickamauga." While commanding in the Army of the Cumberland, he rendered efficient service in Sherman's march to the sea, and at Nashville defeated the Confederates under Hood in 1864. This battle contributed largely to hastening the end of the war. His services were rewarded by promotion to the rank of major general. He had charge of the military district of Tennessee until 1867, when he was assigned to the third military district, and, in 1869, was transferred to the district of the Pacific. A promotion to the rank of lieutenant general was tendered him in 1868, but he declined.

Thomas, JOHN JACOBS, horticulturist, writer, and editor, born in Ledyard, N.Y., Jan. 8, 1810; died in Union Springs, N.Y., Feb. 22, 1895. The brother of Joseph Thomas (*q.v.*), the lexicographer, he became a recognized authority on

agricultural subjects. He contributed articles on practical farm topics to various magazines, notably the *Genesee Farmer* (Rochester, N.Y.), of which he was associate editor in 1834, the *Albany Cultivator*, of which he was horticultural editor (1841-53), and the *Country Gentleman*, founded at Albany in 1853. He was chiefly known as a pomologist and for his work, "The American Fruit Culturist" (1849), which went through 21 editions. He also edited the "Illustrated Annual Register of Rural Affairs" (1855-81) and wrote "Farm Implements and Machinery" (1869), both of which are valuable as records today.

Thomas, JOSEPH, lexicographer, born at Ledyard, N.Y., Sept. 23, 1811; died in Philadelphia, Pa., Dec. 24, 1891. He studied at Rensselaer Polytechnic Institute, Troy, N.Y., and attended Yale Univ. He was graduated from the Univ. of Pennsylvania with a medical degree (1837) and practiced for a short time in Philadelphia. Later, he spent several years in Egypt and India, making a special study of Oriental languages. He taught Latin and Greek at Haverford Coll. and helped to found Swarthmore Coll. (1864), where he became a professor of English. The best known of his writings include: "A First Book of Etymology" (1851-52), "Travels in Egypt and Palestine" (1853), "A New and Complete Gazetteer of the U.S." (1854), "The Complete Pronouncing Gazetteer of the World" (1855), "A Comprehensive Medical Dictionary" (1864), and "Universal Pronouncing Dictionary of Biography and Mythology" (1870-71).

Thomas, LORENZO, soldier, born at New Castle, Del., Oct. 26, 1804; died Mar. 2, 1875. He was graduated from the U.S. Military Acad. at West Point in 1823, and served against the Indians in Florida, in the Mexican War, and in 1852 became lieutenant colonel. In 1861, he was made a colonel and placed in charge of the adjutant general's office at Washington, but the same year became brigadier general in the army. During the latter part of the war he had charge of organization work among colored troops. President Johnson appointed him Secretary of War in 1868, but Secretary Stanton refused to vacate, and so he did not enter upon the duties of the office. He was retired from active service in 1869.

Thomas, NORMAN MATTOON, politician and Socialist leader, born in Marion, Ohio, Nov. 20, 1884. He was graduated from Princeton Univ. (1905), Union Theological Seminary (1911), and ordained as a Presbyterian minister (1911). He was a pastor in New York City (1911-18), founder and editor (1918-21) of *World Tomorrow*, and an editor (1921-22) of the *Nation*. He wrote numerous books on political and social reform, including: "The Conscientious Objector in America" (1923), "A Socialist's Faith" (1951), "The Test of Freedom" (1954), "Prerequisites for

Peace" (1959), and "Great Dissenters" (1961).

He was the Socialist candidate once for governor of New York State, twice for mayor of New York City, and six times for President of the U.S. (1928, 1932, 1936, 1940, 1944, and 1948). He is a forceful lecturer and debater.

Thomas (tôm'ās), SAINT, one of the 12 disciples of Jesus Christ as listed in the Synoptic Gospels. As with the other disciples, it is not hard to create an individual character for Thomas if we compare the various Gospels. The Gospel of St. John proves especially helpful in this regard. Obviously, Thomas can be counted among those apostles who conceived of their adherence to Jesus primarily in an emotional way. The more intense his devotion, the greater the doubts with which he approached the manifestations of Christ. It was this inner uncertainty which tempted him to be in the presence of the Lord as continuously as possible. Since he was not, like Peter, James, and John, with Jesus at the transfiguration (*q.v.*) or at His first apparition after the crucifixion, he was thrown into deep doubts after the crucifixion. However, the "doubting Thomas," exactly as he did during the life of Christ, felt immediately reassured when Christ appeared to him later. Then he saw "the print of the nails" and thrust his hand into Christ's side, and Jesus reproached him: "Because thou hast seen me, Thomas, thou hast believed: blessed are they that have not seen and have believed" (John 20:29).

Later on, he proselytized, particularly in the East, probably in Parthia and India. Whether the historical Parthian king Gunderfor, who ruled in Peshawar, was converted by Thomas is not clear. In any case, he must have preached in the Middle East and in the Indies. The Indian Christians still consider Thomas as their special apostle and the "Acts of Thomas" are considered by them as canonical. The Church of South India is also known as the Syrian Church of Malabar. Greek travelers of the first centuries after Christ already mention the existence of this church, which later split. The Syriac Acts of Thomas are apocryphal, written probably in the 2nd century. The alleged Gospel after Thomas is also apocryphal. Thomas is sometimes depicted as a twin of Christ, but this has been specifically criticized as heresy by the Roman Catholic Church.

Thomas, THEODORE, musical conductor, born at Essen, Germany, Oct. 11, 1835; died Jan. 4, 1905. He received early instruction from his father, who in 1845 brought his family to the U.S. His first appearance in public was at the early age of six years. After coming to America, he played violin solos at New York concerts for two years and subsequently traveled in the Southern states. In 1851, he returned to New York to play as a principal violinist at concerts and operas, but in 1861 became an orchestra leader. He was

made director of the Coll. of Music at Cincinnati in 1878, but resigned two years later to become conductor of the New York Philharmonic Society, and in 1891 established his orchestra at the Chicago Auditorium. He was musical director at the World's Columbian Exposition in 1893. His concerts presented in various cities were popular and he probably did more to raise the standard of music in America than any other one person. Thomas popularized Richard Wagner's music in this country.

Thomasville (tōm'ās-vīl), county seat of Thomas County, Ga., 200 m. s.w. of Savannah, on the Atlantic Coast Line and other railroads. The surrounding country is fertile, producing large quantities of peanuts, tobacco, corn, and truck crops. The Finney Veterans Admin. Hospital is located here. Among the manufactures are textiles, food products, furniture, and farming implements. Thomasville trades largely in its industrial and commercial merchandise. The town was founded in 1823 and incorporated in 1826. Population, 1950, 14,424.

Thomasville, a city in Davidson County, N.C., 28 m. n.e. of Salisbury. It is served by the Southern and the High Point, Thomasville & Denton R.R.'s. The chief public buildings include the City Memorial Hospital, and Mills Home, a Baptist orphanage. Thomasville has manufactures of furniture, hosiery, cotton yarn, underwear, concrete and cinder blocks, mirrors, and mattresses. Dairying and crop raising are the chief industries of the surrounding area. The city was laid out in 1852 and incorporated in 1857. Population, 1940, 11,041; in 1950, 11,154.

Thompson (tōmp'sūn), BENJAMIN. See *Rumford*, Benjamin Thompson.

Thompson, DAVID, explorer, born in Westminster, England, April 30, 1770; died at Longueuil, Canada, Feb. 16, 1857. He studied in London and at Oxford and emigrated to Canada in 1789. For some time he was in the service of the Hudson Bay Co. In 1798, he discovered Turtle Lake, which he claimed to be the source of the Mississippi. He crossed the Rocky Mts. in 1807, and ascended the Columbia River from the junction of the Canoe to its source. From 1816 to 1826 he headed a British commission which surveyed and marked the U.S.-Canadian boundary.

Thompson, DENMAN, actor, born at Girard, Pa., Oct. 15, 1832; died at West Swanzy, N.H., April 14, 1911. His boyhood was passed in Swanzy, N.H., where he came in contact with the rustic types that made him famous. In 1852, he made his debut as an actor at Lowell, Mass. His fame is based largely upon his success in his own sketch entitled "Joshua Whitcomb," which he afterward elaborated into "The Old Homestead," a popular play first presented in 1886 in Boston.

Thompson, DOROTHY, journalist, born at Lancaster, N.Y., July 9, 1894; died in Lisbon, Portugal, Jan. 30, 1961. She was graduated from Syracuse Univ. (1914) and worked as a newspaper correspondent in Austria (1920-24) and Germany (1924-28). For 22 years she was noted for the courageous independence and political insight of her daily column, "On the Record," syndicated through the *Herald Tribune* (1936-41) and the Bell Syndicate (1941-58). She was also known for her radio talks and her column in the *Ladies' Home Journal*. She wrote several books on current affairs and was awarded (1938) the gold medal of the National Inst. of Social Science. She was married three times, once to Sinclair Lewis (q.v.).

Thompson, FRANCIS, poet, born at Preston, England, Dec. 18, 1859; died Nov. 13, 1907. The son of a physician, Thompson was all his life a devout Catholic. He was educated at Ushaw Coll., Durham, and at Owens Coll., near Manchester, where he tried unsuccessfully to study medicine. In 1885, after he had moved to London, poverty and the ravages of opium might have killed him, if it had not been for the kindness of Wilfred and Alice Meynell (q.v.). Wilfred Meynell, as editor of *Merry England*, published Thompson's first poems in 1888. His first volume of verse, which brought him national recognition, was "Poems" (1893). Later collections of verse include "Sister Songs" (1895) and "New Poems" (1897). Among his prose works are "Health and Holiness" (1905), the "Life of St. Ignatius Loyola" (1909), and critical pieces for the *Academy* and the *Athenaeum*. His "Works" (1913) were edited by Wilfrid Meynell. Thompson's best-known poem, "The Hound of Heaven," which appeared in his first volume, describes a human soul seeking in vain to escape from the spirit of God. Although its form and content derive from the "metaphysical" school of the 17th century, particularly from Crashaw, the individual merit of the work has caused Thompson to be ranked among the major religious poets of England.

Thompson, GEORGE, reformer, born at Liverpool, England, June 18, 1804; died at Leeds, Oct. 7, 1878. He early became interested in the anti-slavery movement; after a lecture tour in the British colonies, his arrival in the U.S. on a similar mission induced President Jackson to denounce him publicly. He knew and worked with John G. Whittier and William Lloyd Garrison (qq.v.) and other U.S. abolitionists. His influence in England was great enough to help prevent Great Britain from recognizing the Confederate government. He served in Parliament from 1847 to 1852.

Thompson, LAUNT, sculptor, born in Abbey-leix, Ireland, Feb. 8, 1833; died at Middletown, N.Y., Sept. 26, 1894. He came to the U.S. at an

early age to live in Albany, N.Y., where he studied anatomy in a physician's office. He later turned to sculpture under Erastus D. Palmer. In 1857 he moved to New York, where he became an associate of the Acad. of Design (1859) and a national academician in 1862. He studied in Italy in 1868 and in 1875. Thompson's sculptures have graceful naturalism, which expresses itself best in his portrait busts. Best known are his portrait bust of William C. Bryant, in the Metropolitan Museum of Art, New York, and a soldiers' monument at Pittsfield, Mass.

Thompson (tõmp'sũn), OSCAR, music critic, born Oct. 10, 1887, in Crawfordsville, Ind.; died in New York City, July 3, 1945. He was on the staff of *Musical America* (1919-43), serving as editor for many years. He was critic on the *New York Post* (1928-34), on the staff of the *New York Times* (1935), and critic on the *New York Sun* from 1937 until his death. He also taught music criticism at the Curtis Inst. in Philadelphia and at Columbia Univ. Thompson was the author of "Practical Music Criticism," "How to Understand Music," "The American Singer," and "Debussy, Man and Artist." He was also editor-in-chief of the "International Cyclopedia of Music and Musicians."

Thompson, ROBERT ELLIS, educator, born near Lurgan, Ireland, April 5, 1844; died at Philadelphia, Pa., Oct. 19, 1924. In 1857, he settled in Philadelphia. He attended the Univ. of Pennsylvania and was ordained a minister of the Reformed Presbyterian Church in 1868, when he also became professor of Latin and mathematics in the Univ. of Pennsylvania. He edited the *Pennsylvania Monthly* (1870-81), and subsequently the *American Weekly*.

Thompson, WILLIAM BOYCE, financier, born in Virginia City, Mont., May 13, 1869; died in Yonkers, N.Y., June 27, 1930. The son of a carpenter who grew prosperous from mining and lumbering, he went to Phillips Exeter Acad. and thence briefly to the Columbia Univ. School of Mines. He promoted mines at Butte, Mont., later sold mining stocks in New York City, and made a fortune from silver and copper mines in Arizona. His principal claim to fame was the organization and endowment of the Boyce Thompson Inst. for Plant Research at Yonkers.

Thompsonville (tõmp'sũn-vil), a village of the town of Enfield (q.v.), in Hartford County, Connecticut. It is noted for the manufacture of rugs and carpets; other manufactures include tobacco, paper, and wood products and hardware. Population, 1950, 9,633.

Thomson (tõm'sũn), a town in Georgia, seat of McDuffie County, ca. 30 m. w. of Augusta, on the Georgia R.R. Textiles and wood products are major manufactures. Thomson was incorporated in 1854. Population, 1950, 3,489.

Thomson, ELIHU, American inventor, born in Manchester, England, March 29, 1853; died March 13, 1937. He came to the U.S. in 1858 and studied electricity in Philadelphia, where he afterward became professor of chemistry and mechanics at Central High School (1870-80). Among more than 700 patented inventions, his most important include electric welding, the high-frequency transformer, the electric watt-hour meter, and stereoscopic X-ray pictures. In 1880, he organized the Thomson-Houston Electric Co., which in 1892 merged with the Edison Electric Co. to become the General Electric Co.

Thomson, GEORGE, collector of Scottish music, born at Limekilns, Fifeshire, Scotland, March 4, 1757; died at Leith, Feb. 18, 1851. Although he studied law and spent his life in offices, he was an earnest amateur musician. He played the violin, and was one of the directors of the first Edinburgh music festival (1815). In 1792 he began his life-work of collecting national songs (Scottish, Welsh, and Irish). Feeling that the words of some of the old songs were unsuitable, he induced Burns, Scott, Moore, Byron, and other authors to write new words for old airs; and to round out the airs, he secured the services of Haydn, Beethoven, Weber, and other composers to write accompaniments. One of his daughters married George Hogarth (q.v.), whose daughter Catherine married Charles Dickens (q.v.).

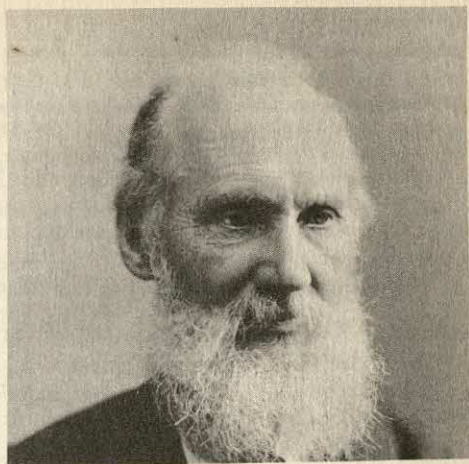
Thomson, SIR GEORGE PAGET, physicist, born at Cambridge, England, May 3, 1892. He was educated at Cambridge and in 1914 became fellow and lecturer at Corpus Christi Coll. there. During World War I he did research in aerodynamics for the R.A.F., and later taught natural philosophy at the Univ. of Aberdeen (1922-30) and physics at the Imperial Coll. of Science in London after 1930. During World War II he served as scientific adviser to the Air Ministry. In 1937 he shared with Clinton Joseph Davisson the Nobel Prize for physics, "for their experimental discovery of the diffraction of electrons by crystals." He is the son of Sir Joseph John Thomson (q.v.), with whom he did some work on the conduction of electricity through gases.

Thomson, JAMES, poet, born at Ednam, Roxburghshire, Scotland, Sept. 11, 1700; died near Richmond, England, Aug. 27, 1748. His father was a minister and he attended school at Jedburgh Abbey. In 1715, he entered the Univ. of Edinburgh. Ten years later, he obtained a position as a tutor in London. "Winter," the first part of his poem in blank verse, "The Seasons," appeared in 1726. His "Ode to the Memory of Sir Isaac Newton" was published in 1727. He completed "Summer," "Spring," and "Autumn" during the next few years. This work was tremendously popular for almost a century, and was much translated and imitated in other countries.

In 1730-31, Thomson traveled in France and Italy as tutor to the son of the solicitor-general, Sir Charles Talbot, and when the latter became Lord Chancellor, Thomson received a sinecure in Chancery, amounting to £300 a year. His tragedy, "Sophonisba," was produced at the Drury Lane Theater in 1730 and was followed some eight years later by "Agamemnon." The latter, although modeled on Greek tragedy, was filled with allusions to contemporary political affairs and was not well received. "Liberty" (1734-36), a long poem in five parts which contained somewhat biased observations on the institutions and people of other countries, did not achieve popularity. In 1740, Thomson collaborated with David Mallet in writing "The Masque of Alfred"; the music was composed by Thomas Arne. This work, in which was included the song "Rule, Britannia," was presented before the Prince of Wales on Aug. 1, 1740. Through his friend, George Lyttelton, Thomson obtained an appointment (1744) as surveyor-general of the Leeward Islands with a salary of £300 a year. In 1745, he produced his masterpiece, "The Castle of Indolence," employing a Spenserian stanza. In the same year, his tragedy, "Tancred and Sigismunda," was produced at the Drury Lane Theater. His last work, the tragedy "Coriolanus," was performed in 1749, after his death.

Thomson, JAMES, poet, born at Port Glasgow, Renfrewshire, Scotland, Nov. 23, 1834; died in London, England, June 3, 1882. Orphaned at seven, he was educated in an orphanage and at an army-supported school, after which he became an army schoolmaster. In Ireland, he fell deeply in love, but the girl died, and his life thereafter was marked by gloom, disappointments, and poverty. After his dismissal from the army (1862), he made a precarious living by clerical work and by journalism. He is best known for two long poems, the conventional but deeply felt "Sunday Up the River," and the remarkable major effort, "The City of Dreadful Night." The latter is a semi-autobiographical poem stemming from the pessimism and insomnia from which he suffered for most of his adult life. For somber intensity coupled with sonorous music, "The City of Dreadful Night" has been said to have no equal in English verse.

Thomson, SIR JOSEPH JOHN, physicist, born at Cheetham Hall, Manchester, England, Dec. 18, 1856; died Aug. 30, 1940. Thomson was made a professor of physics at Trinity Coll., Cambridge, in 1884. He left Cambridge to become professor of physics at the Royal Institute for Natural Philosophy in London (1905), but returned to Cambridge as Master of Trinity Coll. in 1918. Thomson's work centered on the discharge of electricity in gases and the use of positive rays for chemical analysis. His most important dis-



Courtesy Brown Bros., N. Y.

WILLIAM THOMSON

covery was that of isotopy, a development of great importance in atomic theory, and he was awarded the 1906 Nobel Prize for physics "in recognition of the great services rendered by him in his theoretic and experimental investigations regarding the passage of electricity through gases." In addition to the many other honors he received as a scientist, he was knighted in 1908.

Thomson, VIRGIL, composer, born in Kansas City, Mo., Nov. 25, 1896. Graduated from Harvard Univ. in 1922, he taught music there for three years. Thereafter, until 1932, he lived in Paris, studying with Nadia Boulanger. He was there strongly influenced by the so-called "French Six" (*Les Six*)—a group of young composers, among them Darius Milhaud (*q.v.*). This stay explains why Thomson's early songs had French texts. With his opera, "Four Saints in Three Acts," based on a text by Gertrude Stein, he achieved his first great success. Thomson's work is rather extensive: music for the stage, ballet, for films—"The Plow That Broke the Plains" and "The River"—orchestral and chamber music, violin and piano works, and choral and vocal compositions. He wrote on music in Paris and for *Vanity Fair*, the Boston *Transcript*, and (1940-54) the New York *Herald Tribune*. His published books include "State of Music" (1939), "The Musical Scene" (1945), "The Art of Judging Music" (1948), and "Music Right and Left" (1951). His second opera to a Stein text, "The Mother of Us All," was first produced in 1947.

Thomson, SIR WILLIAM, born in Belfast, Ireland, June 25, 1824; knighted in 1866 and made Baron (Lord) Kelvin in 1892; died in London, Dec. 17, 1907. He was professor of physics, at the Univ. of Glasgow for more than 50 years. In 1906, R.A. Millikan (*q.v.*) wrote that Kelvin was the "best known and most prolific of living physicists." He originated the absolute or thermodynamic temperature scale now used for precise

work, especially at low temperatures (see also *Thermodynamics*). In his honor, temperatures are stated in degrees Kelvin; absolute zero, -273.16°C. , is 0°K. , and the melting point of ice, 0°C. , is $+273.16^{\circ}\text{K.}$

He discovered, with J.P. Joule (*q.v.*), as collaborator, that although there should be no change of temperature when an *ideal* gas was allowed to expand through a throttle, there was an actual change in the case of all known gases; the measure of this change is known as the Joule-Thomson coefficient. Practical application of this principle is made in the industrial liquefaction of gases and in commercial refrigeration (whence the trade name "Kelvinator" for a domestic refrigerator).

Kelvin invented instruments and apparatus for precision electrical measurements, among them the quadrant electrometer, an improved absolute electrometer, the mirror-galvanometer, and the current (Kelvin) balance. In 1853, he gave the correct equation for the frequencies of the oscillating discharge from a Leyden jar,

$$f = \frac{1}{2\pi} \sqrt{\frac{1}{LC}} \quad (12 \text{ years before J.C. Maxwell}$$

(*q.v.*) evolved the electromagnetic theory of light and 35 years before H.R. Hertz (*q.v.*) produced and demonstrated the existence of electromagnetic waves in the laboratory). He also contributed to the realization of the Atlantic cable, and was the first to work out the curve of arrival of signal at the receiving end of a long cable, having previously derived the basic equation of propagation in a submarine cable. He was also a member of the International Niagara Commission to harness the Falls for the generation of electric power. The above list indicates only partially the fields covered by this many-sided genius, which range from refuse incineration to the cosmological ether. In 1884, he delivered at Johns Hopkins Univ. (Baltimore), 20 lectures, now world-famous as "Kelvin's Baltimore Lectures on Molecular Dynamics and Wave Theory of Light." Kelvin's *Collected Works*, consisting of his mathematical and physical papers, were published by the Univ. of Cambridge Press (1882-1911).

Thor (*thór*), in Scandinavian legends, the god of thunder and the ruler of the winds and the seasons. He is represented as the son of Odin and Frigga. He was said to have his home in a palace called Thrudwanger, where he received the gallant warriors who had fallen in battle. Thunder was caused by the noise of his chariot wheels; the chariot was drawn by he-goats. Thor hurled his thunderbolts at monsters and giants, but he was a protector of the family and of agriculture. His ensign was a hammer, which, after being hurled at his victims, always returned to his hand. A belt of magic impulses worn about his



Courtesy Gramstorff Bros., Malden, Mass.

HENRY DAVID THOREAU

waist continuously renewed his strength for battle, thus making him ever active and powerful. Thor is spoken of in the *Eddas* as the champion of men and gods, and Thorsday, or Thursday, the fifth day of the week, is named for him.

Thoracic Duct (*thō-rās'ik dūkt*), the largest lymphatic vessel of the human body. It extends from the *receptaculum chyli*, the vessel in which the contents of the lacteals are collected, to the junction of the left internal jugular and the left subclavian veins, passing upward on the left side of the spinal column. This duct is from 18 to 20 in. long, is about $\frac{1}{8}$ in. in diameter, and has numerous valves opening toward the neck. Most of the lymph of the body and chyle is discharged by the thoracic duct into the left subclavian vein. The contents pass upward, but cannot pass downward because of the valves within. At the outlet are valves that prevent the entrance of blood.

Thoracoplasty (*thō-rà-kō-plās'tī*). See *Tuberculosis*.

Thorax (*thō'rāks*), anatomical and zoological term, designating the portion of the trunk, in mammals, which contains esophagus, lungs, heart, and large vessels. It is the middle portion of the body in the Arthropoda (*q.v.*). In the crayfish the head and thorax are fused to form the cephalothorax.

Thoreau (*thō'rō*), HENRY DAVID, poet, essayist, naturalist, born in Concord, Mass., July 12, 1817; died May 6, 1862. His ancestry was Scottish and French. His parents allowed him, when he was no more than 10 or 12 years of age, to go hunting and fishing alone in the wildest sections of forest and river surrounding Concord. Thus familiarity with the wild life of the countryside was a part of his earliest experience. His later education included the study of surveying and a regular attendance at Concord Acad., where he himself taught after his gradua-

tion from Harvard. His liberal educational theories were not acceptable, however, to the authorities; and, after two years, he withdrew from the school in order to work in his father's pencil factory. Here his inventive talents were such that he might well have used them to become wealthy. The factory did not interest him, however, and, during the rest of his life, he worked for money only when it was necessary for him to do so in order to make a living.

He preferred to devote the major part of his time to an intimate association with nature and to reading and writing. The latter occupations brought him into close contact with Ralph Waldo Emerson, the Alcott family, William Ellery Channing, and Nathaniel Hawthorne. He became a member of the Transcendental Club and contributed to the *Dial* (see *Periodical*). From July 1845 to September 1847, he lived alone, with a minimum of expense, at Walden Pond. During this period, he was once arrested, and spent a night in jail, for refusing to pay his poll tax, his reason being that the tax money was used to encourage the spread of slavery, *i.e.*, by supporting the Mexican War. Except for occasional vacation excursions, Thoreau remained in Concord all of his life, faithful until the end to the ideals which he had elected as a young man.

Thoreau wrote three courageous commentaries on the slavery issue—"Civil Disobedience" (1849), "Slavery in Massachusetts" (1854), and "A Plea for John Brown" (1859)—but his usual concern was with a way of escape from all social issues. Feeling that preoccupation with business and with the accumulation of wealth had drawn men away from the primary business of living for its own sake, he recommended a mode of life which, because of its simplicity, would leave the individual plenty of time for contemplation of nature and for the full development of his own personality. Although this attitude was associated with a belief in free will, it seems to indicate his interest in Oriental and Greek thought more than it reflects the Transcendentalism which he sometimes espoused. Many of his ideas are evident in his travel books, such as "A Week on the Concord and Merrimack Rivers" (1849), but they are developed most fully in "Walden; or, Life in the Woods" (1854).

Though Thoreau's verse is not usually regarded as first-rate, the poetic and musical value of his prose, together with the apparent simplicity which sometimes conceals its classic origins, has probably served almost as well as his philosophy to place him among the major writers of American literature.

Thorfinn Karlsefni (*thór'fin kår'l'sëv-ni*), navigator and explorer, *fl.* in the early 11th century. From Iceland he went in 1002 to Greenland, where he organized an expedition (1003-06) to

explore and colonize Vinland (*q.v.*), previously discovered by Leif Ericsson (*q.v.*). Bad weather, dissension, and hostile natives forced abandonment of the project; of the three ships starting on the expedition, only Thorfinn's returned safely to Greenland. The "Saga of Eric the Red" in the collection of Old Norse sagas called "*Hauksbók*" is the main source for the story of the expedition. Many attempts have been made to identify the places described by Thorfinn, but no theory has been generally accepted.

Thorium (*thō'rī-üm*), a radioactive chemical element; its atomic number is 90, its atomic weight 232.12, and its symbol Th. It is a gray, heavy metal, melting at a very high temperature (1,845° C.). It has a half life of 1.39×10^{10} years and is part of a radioactive series of elements, in which thorium, by radioactive decomposition, gives off a series of elements, ending with lead. It was discovered in 1828 by Berzelius, who named it for the Scandinavian god Thor. It occurs naturally as the mineral thorite, as an oxide, and in other compounds. It can be prepared by heating its fluoride or chloride with potassium or sodium.

Thorn (*thörn*), in botany, a sharp-pointed projection found on many kinds of plants, especially among desert plants. In some cases, thorns are formed from stems, as in the honey locust and thorn apples. In others, as in the barberry and black locust, they are formed from leaves or parts of leaves; these are known botanically as spines. In roses, blackberries, and cacti, they are outgrowths of the outer layer of the plant and are known botanically as prickles. In thistles, thorns are special types of hairs. In nettles, such sharp hairs contain a poisonous sap which irritates the skin.

Thorn (*törn*), a city of Poland. See *Toruń*.

Thorn Apple (*thörn äp'p'l*). See *Stramonium*.

Thorndike (*thörn'dik*), EDWARD LEE, educational psychologist, born in Williamsburg, Mass., Aug. 31, 1874; died in Montrose, N.Y., Aug. 9, 1949. He received a B.A. from Wesleyan Univ. (1895), an M.A. from Harvard (1897), and a Ph.D. from Columbia (1898). In 1899 he began his lifelong connection with Teachers Coll. at Columbia, serving as instructor of genetic psychology (1899-1901), professor of educational psychology (1901-40), and director of the psychology division of the Inst. of Educational Research (1922-40). During World War I he directed the U.S. Army's committee on classification of military personnel. His contributions in the field of educational psychology were mainly in the methods he devised for testing and measuring intelligence and the ability to learn. He is important in modern lexicography for his painstaking studies of the frequency with which some 30,000 words occur in general reading matter;

these resulted not only in his own dictionaries for children and young adults (based on new principles of vocabulary, definitions, and phonetic pronunciations) but in the general improvement of school textbooks. He was also deeply interested in the factors which make a good civic community. His many books include "Educational Psychology" (1903), "Mental and Social Measurements" (1904), "The Measurement of Intelligence" (1926), "Your City" (1939), and "Human Nature and the Social Order" (1940). See also *English: LANGUAGE*.

Thorndike, DAME SYBIL, actress, born in Gainsborough, Lincolnshire, England, in 1882. She began her career with the Ben Greet Players, with whom she toured the U.S. (1903-07), and later played in a long series of Shakespearian roles at the "Old Vic" in London. Among her outstanding performances have been *Hecuba* in Euripides' "The Trojan Women," *Mrs. Alving* in Ibsen's "Ghosts," and *Candida* in Shaw's play of that name. In 1957 she appeared in New York City in Graham Greene's "The Potting Shed." She was made a Dame of the British Empire in 1931.

Thornhill (*thörn'hil*), SIR JAMES, painter and etcher, born in Melcombe Regis, Dorsetshire, England, in 1675; died in Weymouth, May 13, 1734. After travels in the Low Countries and France, he settled in London, where he became court painter to Queen Anne. His works, which show strongly the influence of Veronese and Poussin (*q.v.*), include eight frescoes (scenes from the life of St. Paul) for the cupola of St. Paul's Cathedral, London, and decorations for the bedroom of Queen Anne at Hampton Court. Among his pupils was William Hogarth (*q.v.*).

Thornton (*thörn'tün*), MATTHEW, physician, patriot, and signer of the Declaration of Independence, born in Ireland *ca.* 1714; died in Newburyport, Mass., June 24, 1803. Brought to America as a child, he received his early education and studied medicine at Worcester, Mass. In 1740 he opened a practice in Londonderry, N.H., and during the French and Indian War served as an army surgeon. He held a number of political offices in New Hampshire and was a member of the Continental Congress (1776-77).

Thornton, WILLIAM, architect and inventor, born in Tortola, V.I., May 20, 1759; died in Washington, D.C., March 28, 1828. He early settled in Philadelphia, Pa., where in 1789 he was the prize-winning contestant for the design of the Philadelphia Library. In 1792 he won a competition for the design of the Capitol Building, in Washington, D.C. (the chief parts of which are still those he designed), the construction of which he helped to supervise. He designed several private homes, among them the Octagon House in Washington, D.C. In addition to archi-

ture, in which he leaned chiefly toward the classical style, he devoted much time to steamboat experiments, in cooperation with John Fitch (*q.v.*). He published "Short Account of the Origin of Steam Boats" (1814). Thornton was in charge of patents, in the State Dept. and in the later Patent Office, from 1802 until his death.

Thorpe (*thórp*), JAMES FRANCIS ("Jim"), athlete, born near Prague, Indian Territory (now Oklahoma), May 28, 1888; died near Los Angeles, Calif., March 28, 1953. Of Indian parentage, he went in 1907 to the Carlisle (Pa.) Indian School, where he developed into a superior football player under the coaching of the famous Glenn L. ("Pop") Warner. In the 1911 and 1912 seasons, Thorpe led the Carlisle team to victories over such favored teams as Army, Harvard, and Pennsylvania. In the 1912 Olympic Games at Stockholm, Sweden, he won both the decathlon and pentathlon events. However, when it became known in 1913 that he had played semiprofessional baseball, Thorpe was forced to return his Olympic awards, and his name was taken off the lists of Olympic winners. (Friends and admirers made various attempts to get this ruling reversed, but none had succeeded by the time of his death.) He played professional baseball (1913-19), in the major and minor leagues, and professional football (1920-29). In 1950 a poll of sports writers taken by the Associated Press named Thorpe the greatest male athlete and the greatest football player of the first half of the 20th century.

Thorvaldsen (*thórv'vål-sen*), or THORWALDSEN, ALBERT BERTEL, sculptor, born in Copenhagen, Denmark, Nov. 15, 1770; died there, March 24, 1844. In 1793 he was awarded the first gold medal of the Acad. of Copenhagen; from 1797 he spent most of the rest of his life in Rome. His work was praised by Antonio Canova (*q.v.*), with whom he became a joint leader of the neoclassical movement. Under the influence of Greek art, Thorvaldsen created many statues of mythological subjects (*e.g.*, Jason, Venus, Psyche, and Gany-mede). His best-known works are the bas-reliefs "Night and Morning" and "The Triumphal Entry of Alexander into Babylon" (1812), and the colossal "Lion of Lucerne" (1819), which his students carved from the native rock after his design. He executed a number of religious sculptures for Copenhagen, including "Christ and the Twelve Apostles" (1838) and "The Preaching of John the Baptist." The Thorvaldsen Museum in Copenhagen contains a complete collection of his work, in originals and his own models. Although he was extravagantly admired in the 19th century, Thorvaldsen is now generally considered a tasteful but not highly original interpreter of the classical period.

Thoth (*thôth*), in ancient Egyptian religion, the scribe of the gods, to whom all secret wisdom

was attributed, and who recorded the annals of the dead. He was the patron of learning and the arts and the inventor of writing. He is often represented as a man with the head of an ibis or an ape, and carrying a pen and an inkwell. As he is also sometimes depicted with the moon-symbol, he was probably first a moon-god. In the Hellenistic period, Thoth came to be identified with the Greek god Hermes (*q.v.*) and as Hermes Trismegistus became the patron god of magicians.

Thothmes (*thōth'mēs*), or THUTMOSE, the name of four Egyptian kings of the 18th Dynasty, of whom the most famous, THOTHMES III, is considered to have been the ablest of the pharaohs. He ruled for 54 years, from 1501 to 1480 B.C. as a satellite of his sister and consort, Queen Hatshepsut, and from 1479 to 1447 B.C. as sole monarch. After the death of the queen (1480), the Syrians, who had been subjugated by Thothmes I, rose in revolt; Thothmes III crushed the uprising in a great battle at Megiddo (Armageddon), and re-established Egyptian control over southern Syria. In the succeeding years, a series of more than 15 campaigns extended the frontiers of Egypt to include the Sudan, Abyssinia, Mesopotamia, Armenia, Kurdistan, and part of Arabia. Thothmes was active in repairing and building temples in Egypt, especially at Karnak. Of the twin obelisks which he erected at Heliopolis, the so-called Cleopatra's Needles (*q.v.*), one now stands on the Thames Embankment, London, and the other in Central Park, New York City.

Thought (*thōt*), the mental process by which ideas and beliefs are attained, entertained, and retained or rejected (or, in some uses, the ideas and beliefs themselves). It may be mere imagination and reverie, but the word better befits inferences and conclusions intended to solve definite problems by principles of reason (*q.v.*). There is no one standard psychology or philosophy of thought; but, typically, thought starts with data (which may be either sense perceptions or intellectual premises), abstracts common characters, brings memories to bear, constructs conceptual forms, draws deductions, and tests their consequences, either perceptually or conceptually. Thought is generally considered man's chief glory and best access to truth, but there are old doubts about it. Being devoted to abstract and universal concepts and propositions, can it deal adequately with concrete individuals? Is it confined so narrowly to the materials of sensation (*q.v.*), or so subservient to man's passions and practical aims (see *Freud* and *Pragmatism*) that it cannot reliably discern reality? Its physical basis, closely linked with organs of language, is subtle and fluctuant circuits in the central nervous system. This fact is readily confirmed by

mathematical and logical studies both of cerebral nerve nets and of electrical calculators. Such facts, however, as that thought is conscious, abstract, general, creative, and intentional, capable of validity and truth, are philosophical grounds for the tradition that it involves a principle transcending matter, energy, and space-time altogether.

Thousand and One Nights (*thou'zand ānd wūn nīts*). See *Arabian Nights' Entertainments*.

Thousand Islands (*thou'zand i'landz*), a group of some 1,700 islands in the St. Lawrence River just below the mouth of Lake Ontario, in Ontario Province, Canada, and New York State. The islands, dispersed on both sides of the international boundary, include several New York state parks and the St. Lawrence Islands National Park in Canada. The region is a popular summer resort, famous for boating and fishing. An international highway, 8.5 m. long from mainland to mainland, crosses the river boundary, between Wells and Hill islands, on a graceful suspension bridge.

Thrace (*thrās*), an area of southeastern Europe, comprising northeastern Greece, southern Bulgaria, and European Turkey. Greek and Bulgarian Thrace are separated by the Rhodope Mts., and the Maritsa River separates Greek from Turkish Thrace. The chief cities are Istanbul, Adrianople, and Gallipoli, all in Turkish Thrace (Eastern Thrace). Except for the mountainous Bulgarian section, the entire area is predominantly agricultural, producing wheat, cotton, tobacco, olive oil, and fruit.

In ancient times, the entire region north of Greece to the Haemus Mts. and east of the Black Sea was called Thrace. It was inhabited by a barbarous, warlike race, of Indo-European origin, whom the ancient Greeks hired as mercenaries, and whose gold and silver mines they exploited. Greek colonies were established at Byzantium, Tomi (modern Constanta), Adrianople, and elsewhere. In later times, Thrace was successively under Macedonian, Roman, Byzantine, and Turkish rule. After the Russo-Turkish War (1878), northern Thrace was constituted an autonomous district under Turkish control and was called Eastern Rumelia. In 1913 this district became part of Bulgaria. Later in 1913, Bulgaria also acquired Western Thrace but was forced to cede it to Greece after World War I. Greek Thrace (area, 3,315 sq. m.) comprises the *nomoi* (departments) of Evros (Evros) and Rhodope; its population in 1951 was 336,736.

Thrasher (*thrāsh'ēr*), the common name of some of the birds belonging to the mockingbird family. The bill is long and curved, the tail is long, the upper parts are brown or gray and the under parts paler, either unmarked or streaked with darker color. Most of the thrashers are re-

stricted to the southwestern U.S. and northern Mexico, but the well-known brown thrasher is found east of the Rocky Mts. from southern Canada to Colorado and Florida, wintering in the southern states and along the Gulf Coast. Thrashers are fine songsters but are excelled by their near relative, the mockingbird.

Thread (*thrēd*), a twine or cord made by the spinning of floss. The most extensively used thread is made of cotton for manufacturing, home sewing, and handicrafts. It is made from the fibers of the best grade of cotton, usually the sea island cotton, largely by machinery. The cotton fibers are first picked and passed through the carding machine, after which they are fed into the drawing frame. A series of rollers in the drawing frame causes the carded cotton to be drawn out into ribbonlike forms, this being effected by each succeeding set of rollers moving faster than the preceding. It is then taken to the doubling frame and compressed to form a delicate strip, and these strips are again carded, after which they are wound upon a bobbin. The number of yarns, the direction of twists, and the number of twists per inch are all factors in providing the variety of threads required for different purposes. Thread sold on the market is either white (bleached) or colored (dyed), wound upon wooden spools or cardboard cones. Colored thread is often mercerized to develop luster and improve strength. Other kinds of thread besides cotton include linen, silk, nylon, Dacron, and Orlon.

Threadworm (*thrēd'wūrm*), or PINWORM or SEATWORM, a round worm from $\frac{1}{4}$ to $\frac{1}{2}$ in. long, which is probably the most common intestinal parasite in man. Its eggs are transmitted to the human host via contaminated food or hands. Each egg contains a worm embryo, which is released in the small intestine, where it reaches adulthood and develops more eggs. The eggs are deposited (usually at night) on the skin about the anus, where the traveling worms produce itching and irritation. Reinfection and transmission to other members of the family are responsible for the stubbornness of the condition. Prevention of reinfection and examination by a doctor are essential to a complete cure.

Threat (*thrēt*), in law, an expression of intention by a person to do something which the person has a duty to refrain from doing. In general, the law does not seek to protect individuals from invasions of peace of mind because of what are felt to be insuperable practical difficulties in giving such protection. To put a person in reasonable apprehension of imminent bodily harm is an assault, which is both a crime and a civil wrong for which the person assaulted can recover reparation. A contract which is induced by threats or other duress can be voided; a will induced by threats will not be admitted to probate.

No legal consequences attach to a threat, unless it was reasonably calculated to place a person in reasonable apprehension of the harm threatened. In recent years, the courts have tended to take into account the sex, age, education, and other characteristics of the person threatened in determining whether the person's apprehension of the threatened harm was reasonable.

Three-Mile Zone (*thrē-mīl' zōn*). See *Territorial Waters*.

Three Rivers (*thrē rīv'ērz*) or TROIS RIVIÈRES, county seat of St. Maurice County, Quebec Province, Canada, at the confluence of the St. Lawrence and the St. Maurice rivers, 80 m. N.E. of Montreal. The trading center for a large agricultural and lumber-exporting area, it is served by the Canadian National and Canadian Pacific R.R.'s. Manufactures include newsprint, metal products, aluminum, and abrasives. Three Rivers was founded (1634) by Champlain and became an important French trading post and fortified port. The first iron smelter in Canada was built here ca. 1730. The city was incorporated in 1844. Population, 1951, 46,074.

Threshing Machine (*thrēsh'ing mā-shēn'*), a machine used to separate grain from chaff and straw. Formerly, harvested stalks were spread on a hard-surfaced "threshing floor," and the grain was beaten out of its husks by blows with a flail, a sort of hinged, flat-surfaced bat, swung by hand. Another process was to have the grain stalks trodden by horses or oxen.

The threshing machine dates from 1786, when Alexander Meikle, a Scot, constructed a thresher embodying the principal features of the modern machine: a rotary cylinder with teeth which closely pass teeth on a corresponding concave surface; shaking and fanning devices to separate the grain from chaff and straw; screens of varying mesh to deal with different kinds of grain and to eliminate weed seeds. The first such machines were operated by horses, later ones by locomotivelike steam tractors, still later by internal-combustion tractors.

The threshing machine reached its peak of development and use in the first decade of the 20th century, at the same time as the final homesteading of the U.S. West and Northwest. About 1880 the forerunner of the modern mobile combine (*q.v.*), which cuts, threshes, separates, and delivers threshed grain into a wagon moving alongside, began to appear in California and soon spread eastward to the Great Plains wheat belt. Production of combines passed that of threshing machines in 1928. By 1950, fewer than 200 new threshing machines were being sold annually in the U.S. See also *Harvesting Machinery*.

Thresher Shark (*thrēsh'ēr shārk*) or FOX SHARK, a species of shark found in the warm seas. The tail is peculiarly long and is used in

aiding to obtain food. This shark usually rushes into a school of gregarious fishes and kills or stuns many by thrashing about with the tail. The larger specimens are about 15 ft. long and are whitish beneath and gray-bluish above. These fish are found in the Mediterranean and the Atlantic. They are not valuable as a commercial fish.

Thrips (*thrips*), the name of a genus of minute insects. The body is slender and has four wings, but they appear to leap rather than fly. About 30 American species have been described; they bear a close resemblance to the plant lice. These insects attack the flowers and leaves of plants, but some species feed upon other insects. Some are injurious to tobacco, while others damage onions and timothy grass.

Thrombophlebitis (*thrōm'bō-flē-bī'tis*). See *Phlebitis*.

Thrombosis (*thrōm'bō'sis*), the formation of a thrombus (*q.v.*) or clot in the blood vessels or heart, due to injury, infection, or circulatory impediment such as in prolonged illness, tight clothing, pregnancy, or after an operation. An *embolus* (piece of thrombus broken off from its source of origin such as in a vein in the leg) may occasionally lodge in the heart, lung, or brain and cause severe damage to these organs and even death if a large enough vessel is blocked thereby. See also *Heparin*; *Varicose Veins*; *Phlebitis*.

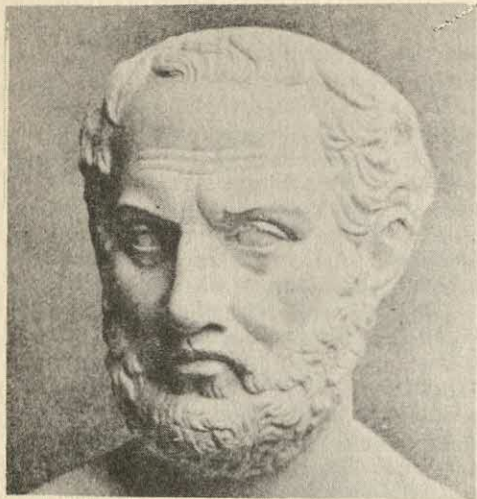
Thrombus (*thrōm'būs*), in medicine, a clot of blood formed within the blood vessels or heart, due usually to alterations of the blood or vessel walls or to slowing of the circulation. Annular thrombus involves the whole lining of a vessel, but not entirely occluding it. Antemortem thrombus is white thrombi formed in the heart and large vessels before death due to other conditions such as heart failure, shock, etc. Coronary thrombus affects a coronary artery (supplying the heart wall) or branch thereof. Progressive thrombus is one growing into and up the lumen of a vessel.

* **Thrush** (*thrūsh*), a genus of birds common to all the continents and most of the islands. They include a great variety of species. Some are gregarious, others live solitarily or in pairs, and some are migratory. The *wood thrush* is one of the most widely distributed species of North America, ranging from Guatemala to southwestern Canada. It migrates southward in the fall, usually to the Carolinas and beyond. The length is 8 in., with a wingspread of about 14 in. It is quite shy, usually preferring its native woods, and the song is clear and beautiful. The *brown thrush*, or *thrasher*, is another widely distributed bird and its song is the most beautiful of the American thrushes. It is reddish-brown above and yellowish-white below, and somewhat resembles the mocking bird. The *hermit thrush* is an

American bird of solitary habits. The best known of the European species is the *song thrush*, a bird of beautiful song. Its plumage is brown and yellowish, with numerous spots of dark brown. It inhabits all parts of Europe, but moves southward on the approach of winter. Both male and female are attentive to their young, usually four to six in number. The body of a full-grown song thrush of this kind is 9 in. long. Its song is very beautiful and it may be taught simple airs in captivity. Other species include the *West Indian thrush*. The common robin belongs to the thrush family.

Thrush, or MYCOTIC STOMATITIS, PARASITIC STOMATITIS, a form of stomatitis (inflammation of the mucous membranes of the mouth and lips), due to the specific fungi, *Oidium albicans* and *Saccharomyces albicans buccalis*, which occur most frequently in infants and children and occasionally in debilitated adults. Characteristically small white flecks appear on the edges of the tongue and inner side of the lips which grow and coalesce into diffuse white patches. The saliva becomes scanty and acid. Occasionally the infection spreads to the tonsils, pharynx, and esophagus. The filaments of the fungus can be seen on microscopic examination of material from a white patch. Treatment includes a careful routine of oral antisepsis and painting the lesions with a fungicidal dye, such as 1 per cent gentian violet solution, upon which the condition rapidly clears up. The word thrush is also applied to stomatitis seen as a symptom of sprue (*q.v.*).

Thucydides (*thū-sīd'i-dēz*), historian, born in Athens, Greece, about 471 B.C., died about 400. He was a son of Olorus, and studied oratory under Antiphon and philosophy under Anaxagoras. As his family owned gold mines in Thrace, he obtained an excellent education, and rose rapidly as a prominent influence in society and in public affairs. Herodotus impressed him so much that he modeled largely after that writer, but greatly excelled him in style. In 424 B.C. he was given command of an Athenian squadron at Thasus, but, being charged with carelessness in performing his duty in the Peloponnesian War, he was exiled for 20 years. It is thought that the period of his exile was spent in several towns of the Peloponnesus, but this is not certain. His writings include eight books of history, but the last of the series does not contain political speeches, a striking feature of the first seven books, and has therefore been assigned to other writers. These historical writings treat of the Peloponnesian War, which covered the period of 29 years between 431 and 402 B.C., but they extend only to the year 411 B.C. It is not certain whether Thucydides died at that time or whether the latter part of the history, if completed, was destroyed. As a writer he closely analyzed char-



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acter and action, and treated his subject-matter with remarkable accuracy. His understanding of men's motives and beliefs is revealed in his renditions of speeches, especially the famous "Funeral Oration" of Pericles.

Thugs (*thŭgs*), members of a secret oriental religious society, worshipers of Kali, the goddess of destruction. The name Thug was derived from a Sanskrit word meaning "cheat." Thugs were reported to exist as early as 1300 and carried on a flourishing activity until the 19th century. A well-organized body of professional assassins, they traveled in gangs committing murders according to a rigidly prescribed ritual. Most of their victims were wealthy travelers, and the Thugs lived off the plunder, usually setting aside portions as tribute to Kali and to support families of deceased Thugs. In accordance with their religious beliefs, they strangled their victims with a noose made from a yard of cloth, plundered them, and then buried them with great secrecy in isolated places. Thugs did not murder women, and they were forbidden to touch certain classes. Lord William Cavendish Bentinck (*q.v.*), governor general of Bengal, began the suppression of the Thugs in 1829 and completed it during his tenure as the first governor general of India. By 1840 the society was virtually wiped out.

Thule (*thŭ'lē*), the name given by the ancient Greeks to the most northerly portion of Europe known to them. It is thought to have referred to a part of Norway or the Shetland Islands. Later the Romans applied the same name to the northernmost parts of the earth, and the term *Ultima Thule* was used in oratory for the most distant unknown land.

Thumb (*thŭm*), the first digit of the human hand. It is commonly shorter and thicker than the other digits, called *fingers*, and has only two phalanges as compared to the fingers' three. It is

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so located that it can be opposed to the fingers and the palm, and is therefore a major influence on the fact that man is a tool-using animal.

Thumbscrew (*thŭm'skrōō*), a screw (*q.v.*) whose head is either polygonal or knurled (roughened) so that it may be turned by the thumb and fingers, without need for tools. The winding stem of a watch is a familiar example. The name is also applied to a medieval and oriental device for torturing prisoners by applying excessive pressure to the thumbs or fingers.

Thun (*tōon*), a commune in Switzerland, in Bern canton, 15 m. s.e. of Bern. It is on the Lake of Thun and the Aar River and is a popular tourist resort. Among its manufactures are metal products and pottery. Population, *ca.* 20,000.

Thun, LAKE OF, a lake in the canton of Bern, Switzerland. Formed by a widening of the Aar River, it is 2 m. wide and 10 m. long.

Thunder (*thŭn'dēr*), the noise which accompanies flashes of lightning (*q.v.*). It is caused by the rapid expansion of air heated by the lightning.

Thunderbird (*thŭn'dēr-bērd*), in primitive religions, a bird supposed to be responsible for thunder and therefore worshiped as a bringer or withholder of rain. It occurs in the mythologies of South America, Africa, and Siam; the best-known thunderbird is that of the American Indians. It is a common motif in the art, weaving, and metalwork of the Indians of the Southwest.

Thurber (*thŭr'bēr*), JAMES GROVER, author and cartoonist, born in Columbus, Ohio, Dec. 8, 1894; died in New York, N.Y., Nov. 2, 1961. After attending Ohio State Univ., he worked (1918-20) as a code clerk in the U.S. State Dept. He then entered journalism (1920) as a reporter on the Columbus *Dispatch* and became (1925) a feature writer for the New York *Evening Post*. He began contributing short stories and essays to the *New Yorker* in 1926, as well as his famous cartoons, done in a few sketchy lines, depicting wistful dogs, dominating women, and timid men. Among his writings are "My Life and Hard Times" (1933) and "Thurber Country" (1953), both autobiographical; "The Years with Ross" (1959), memoirs of his association with HAROLD WALLACE ROSS (1892-1951) editor and founder of the *New Yorker*; the classic short story "The Secret Life of Walter Mitty" (1939); the play (with Elliot Nugent) "The Male Animal" (1940); and the collection "Thurber Carnival" (1960). The last-named title was used for a stage revue incorporating parts of his works, in which Thurber himself appeared briefly shortly before his death.

Thuringia (*thŭ-rĭn'jĭ'ā*), formerly a federated state of Germany, formed in 1919 from the following states then parts of the German Empire: Reuss, Saxe-Weimar-Eisenach, Saxe-Meiningen, Saxe-Altenburg, Saxe-Gotha (Coburg was merged with Bavaria), Schwartzburg-Rudol-

stadt, and Schwartzburg-Sonderhausen. Area, 4,541 sq. m. Capital, Weimar, with ca. 50,000 inhabitants. The Thuringian forest covers a considerable part of the district, whose principal river is the Saale. Lignite, potash, iron ore, marble, cobalt, copper, slate, chalk, basalt and salt are the chief minerals. Textiles, glass and porcelain, machinery, paper and leather goods, musical instruments, beer, chemicals, and wooden toys are among the principal products. Jena and Ilmenau are centers for the manufacture of optical and scientific instruments. Ninety per cent of the population is Protestant; there is a small Wendish (Slavonic) element. The university at Jena dates from 1557.

In the 5th century, the Thuringians were forced to pay tribute to Attila the Hun, but in 804 the Thuringian mark (*q.v.*) was established as a protection against the Slavs. In the 11th century Thuringia fell to Louis the Bearded, whose descendants ruled until 1263, whereupon the Landgravate of Thuringia fell to Henry II, Margrave of Meissen. In 1440, Thuringia passed to Saxony, and, in 1485, to the Ernestine branch of the Wettin family, whose descendants ruled the various parts of Thuringia down to 1918. The area was captured by the Allies in the early part of 1945, toward the close of World War II. Following the war the area was included in the Soviet Zone of Occupation. Population, ca. 1,750,000.

Thurlow (*thúr'ló*), EDWARD, FIRST BARON OF, lawyer and lord chancellor, born at Bracon Ash, Norfolk, England, Dec. 9, 1731; died at Brighton, Sept. 12, 1806. He was educated at the Canterbury Grammar School and Caius Coll., Cambridge, but did not take a degree. Instead he was articled to a solicitor and admitted to the bar in 1754. He was elected to Parliament for Tavistock in 1765. He became solicitor general in 1770 and was appointed attorney general in 1771. A Tory, he supported George III's policy of coercion in the American colonies and opposed prohibition of the slave trade. He became Lord Chancellor in 1778, remaining in that office through the Rockingham and Shelburne ministries. During the Fox-North coalition ministry (1783) he withdrew and as a member of the opposition for the king blocked Edmund Burke's reform measures in the India bill. This bill weakened the influence of the crown by giving the government of India to a board chosen by the House of Commons and not removable by the crown. He was chancellor again under William Pitt the younger, but was finally dismissed because of his opposition to the national debt redemption plan. He was retired with the title of Baron Thurlow of Thurlow and continued to sit in the House of Lords until 1802. He was known for his caustic wit and overbearing zeal as a statesman.

Thurman (*thúr'man*), ALLEN GRANBERRY, jurist and U.S. Senator, born in Lynchburg, Va., Nov. 13, 1813; died at Columbus, O., Dec. 12, 1895. He was descended from the family of Joseph Hewes, a signer of the Declaration of Independence. His parents settled at Chillicothe, O., in 1819, where he attended the public schools and the academy. After surveying for some time, he studied law and in 1835 was admitted to the bar. He became a member of Congress in 1844, served as justice of the state supreme court from 1851-54, and was chief justice from 1854-56. In 1867, he was the unsuccessful Democratic candidate for governor of Ohio, being defeated by Rutherford B. Hayes by fewer than 3,000 votes, but was elected to the U.S. Senate in 1869, serving in that body until 1881. He was the leader of his party in the Senate, and for some time was its president *pro tem*. The Thurman Act, which compelled the Pacific railroads to execute their contracts with the government, was one of the important laws formulated by him. President Garfield appointed him a delegate to the Paris monetary convention in 1881. He was mentioned as a candidate for President at various times and in 1888 became the nominee for Vice President with Cleveland, but was defeated at the polls.

Thursday (*thúr's'dí*). See *Thor*.

Thwaites (*thwáts*), REUBEN GOLD, historian, born in Dorchester, Mass., May 15, 1853; died Jan. 17, 1916. He received a public school education, did post-graduate work at Yale, and in 1876 became editor of the *Wisconsin State Journal* at Madison, and secretary of the Wisconsin State Historical Society. He was the editor of "Jesus Relations and Allied Documents" (73 vols.), "Early Western Travels" (32 vols.), and "Original Journals of the Lewis and Clark Expedition" (8 vols.).

Thyme (*tím*), an aromatic plant of the mint family. The genus comprises about 30 species, mostly native to the southern part of Europe. The common thyme has an upright stem, about a foot high, and a strong odor. It is cultivated in gardens as an ornamental plant and yields an essential oil used for flavoring. Several species have been naturalized in North America.

Thyratron (*thí'rà-trôn*), a trade name for a gas-filled, grid-controlled, triode tube used in electronics. The three elements of the thyratron are those of the triode vacuum tube, *i.e.*, the cathode at which electrons (electric current) enter the tube, a plate or anode where electrons leave the tube, and a grid, or screen, inserted between the cathode and the plate. In the thyratron tube, the cathode is completely shielded by the grid so that electrons cannot pass from the cathode to the anode without first going through the grid. Instead of vacuum, the thyratron tube is filled with a gas. In operation, the anode is positively

charged. The cathode is heated to the proper temperature for the emission of electrons. The grid is then given a positive charge. The heat and the positive charge on the grid ionize the gas in the tube. Gas becomes ionized when its atoms each lose an electron. The electron becomes a negative ion, the atom itself becomes a positive ion. The positive ions proceed toward the cathode and accept electrons, while the negative ions proceed toward the anode and give themselves up. After the positive ions have accepted electrons from the cathode, they become neutral atoms again, only to be broken up by collision with electrons moving toward the anode and positive ions moving toward the cathode. Thus a current is set up which continues from the cathode to the anode where electrons go out of the tube. This current is controlled by the charge, positive or negative, which is applied to the grid. If the grid is made negative, positive ions rush toward it and try to neutralize it, blocking the path of electrons from the cathode which must pass through the grid to the anode. By powering the grid with alternating current, and timing its phases of positive and negative to oppose the anode phase-charges, the tube can be used to rectify or change a.c. current to d.c. It can also be made to change d.c. to a.c. Since the grid current determines at what point ionization of the gas will begin and the rate of electron flow, the thyatron has proved to be a most useful control device. Attached to other electronic equipment, signals automatically switch on power in the grid of the thyatron tube, which instantly starts the operation of other machinery. This tube was one of those used in the proximity fuze invented during World War II. It is also used in radio and radar apparatus.

Thyroid (*thý'roid*), in medicine, refers to the thyroid gland, or to a medical substance produced from it (thyroid extract). The *thyroid gland* is one of the principal essential ductless glands or organs of internal secretion. (See *Secretion*; *Endocrinology*; *Hormones*.) The thyroid is located in front of the lower part of the trachea in association with the thyroid cartilage. (See *Anatomy*.) It consists of two lobes, one on either side of the trachea, connected across in front by an isthmus. Thyroid tissue is composed of many small tubular glands lined with epithelium. These little glands are filled with an opaque substance called collagen, in which the thyroid hormone *thyroxin* is stored. The function of the thyroid gland is to form thyroxin, which is essential in the regulation of growth and metabolism (oxygen consumption and heat production) of the body.

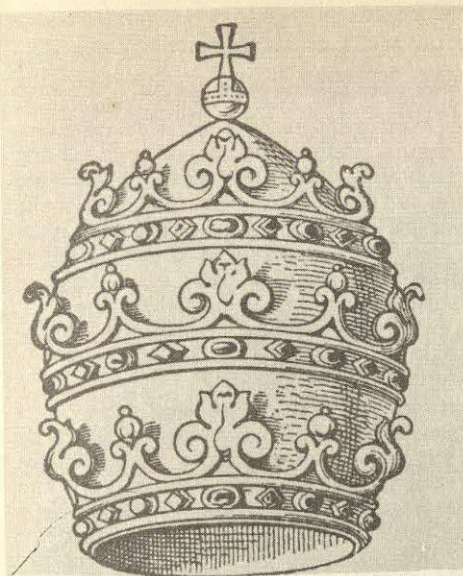
Disease of the thyroid gland is frequently accompanied by increase in size. This enlargement is called *goiter*. The most common goiters are

of two classes. *Simple, endemic, or colloid goiter* is enlargement of the thyroid due to lack of iodine in food and water. The enlargement may be either diffuse or irregular, and the gland may occasionally become large enough to obstruct swallowing and breathing. Continued lack of iodine in infancy and childhood may result in cretinism or thyroid dwarfism (see *Midget*). Colloid goiter is very common in areas where food and water are deficient in iodine, such as the Great Lakes Basin in the U.S., and in the Swiss Alps. This kind of goiter is prevented or alleviated by adequate iodine intake, as in iodized salt. The second class of goiters occurs in *Graves' disease*, also called *exophthalmic goiter* and *primary hyperthyroidism*, a condition of uncertain cause characterized by excessive function and variable enlargement of the thyroid gland. In contrast to colloid goiter, this disease has typical signs and symptoms of weight loss associated with exaggerated appetite, excessive perspiration, decreased tolerance of heat, nervousness and tremors of the hands, rapid heart rate and pulse, weakness, palpitation, and often other heart symptoms. A characteristic sign is exophthalmos—staring, protruding eyes with widely opened, nonblinking lids. The basal metabolism is greatly increased. Effective treatment has consisted of careful iodine medication with careful surgical removal of the thyroid. Recently a new drug, thiouracil, has shown promise of reducing the need for surgery.

Another less common disease of the thyroid, without enlargement, is *myxedema*, caused by insufficient production of thyroxin. Common signs are sleepiness, slow thought and action, fatigue, loss of hair, intolerance to cold, and dry, pale, scaling skin. The basal metabolism is low. Administration of dried thyroid extract (obtained from cattle) in carefully regulated doses results in dramatic improvement.

Tiahuanaco (*tyä-wä-nä'kō*), a ruined city of Bolivia, several miles from the Peruvian frontier, on a desert plain halfway between Lakes Titicaca and Aullagas, at an altitude of 12,900 ft. The present Tiahuanaco stands near by and is built largely of stones from the ruins. Old Tiahuanaco contains five buildings known as the Fortress, the Temple, the Palace, the Hall of Justice and the Sanctuary. The masonry, which was laid without mortar, is tongued and grooved, each stone being held to the next with bronze pins and T-clamps. The statuary, except for a head remaining from a statue three times the height of a man, has disappeared. The building stone was transported many miles and dressed with bronze or stone tools. The design is ascribed to the Incas or Aymaras, but the reason for the location, aside from possible religious significance, remains a mystery.

Tian Shan (*tyän shän*). See *Thian Shan*.



PAPAL TIARA

Tiara (*tê-âr'q*), a kind of headdress worn by the ancient Persians, particularly by the Persian kings, and later adopted as a symbol of papal authority. The papal tiara is a cylindrical diadem pointed at the top, tipped with the mound and cross of sovereignty, and surrounded by three crowns which symbolize the Pope's threefold sovereignty. Until late in the Middle Ages the tiara was synonymous with the bishop's miter, and at ceremonies of a purely spiritual nature the Pope still wears the miter. The tiara was first provided with an encircling crown in about 1130; the second crown was added by Boniface VIII (1294-1303), while the third was first worn by Benedict XII (1334-42).

The jeweled ornamental headdresses worn by women in formal dress are also known as tiaras. Similar head pieces are worn by the nobility on state occasions.

Tibbett (*tib'ět*), LAWRENCE MERVIL, concert and operatic baritone, born in Bakersfield, Calif., Nov. 16, 1896; died in New York, N.Y., July 15, 1960. He studied at Manual Arts Jr. Coll. and made his operatic debut (1923) at the Hollywood Bowl. A member of the Metropolitan Opera Company from 1923 to 1950, he was also successful on the concert stage, on radio, and in motion pictures. His best-known roles were in "Tannhäuser" and "Peter Ibbetson."

Tiber (*tî'búr*), in Italian, TEVERE, a river of central Italy. It rises in the Apennines, about 20 m. N.E. of Arezzo, and flows generally south through Tuscany, Umbria, and Latium, then southwest through Rome, emptying into the Tyrrhenian Sea, through two mouths, about 16 m. S.W. of Rome. The Tiber is about 250 m. long and is the second largest river in Italy; its princi-

TIBET

pal tributaries are the Chiana, Nera, and Aniene.

Tiberias (*tî-bêr'i-qs*), a city in northeastern Israel, located 695 ft. below sea level on the western shore of the Sea of Galilee, about 30 m. E. of Haifa. Tiberias is a commercial center and a noted health resort, with medicinal hot springs. It was founded (*ca.* A.D. 20) by Herod Antipas and was named for the emperor Tiberius. After the destruction of Jerusalem by Titus, Tiberias became an important center of Jewish learning and a seat of the Sanhedrin; the Talmud and Mishna were completed here. In the 12th century Tiberias was a stronghold of the Crusaders, who were defeated here (1187) by the Saracens under Saladin. Population, 1951, *ca.* 16,000.

Tiberius (*tî-bêr'i-ús*), full name, TIBERIUS CLAUDIUS NERO CAESAR, Roman emperor, born Nov. 16, 42 B.C.; died March 16, A.D. 37. He was the son of Tiberius Claudius Nero and Livia Drusilla and the stepson of Augustus. After conducting a campaign in Armenia, Tiberius served (19-12 B.C.) as governor of Transalpine Gaul and aided his brother, Drusus Germanicus, in fighting the German tribes on the Rhine and the Danube; he became consul in 13 B.C. In 12, at the command of Augustus, Tiberius divorced his wife, Vipsania Agrippina, and married Augustus' daughter Julia, the widow of Agrippa. After the death (9 B.C.) of Drusus, Tiberius campaigned against the Germans. Following a second consulship (7 B.C.) he retired to Rhodes, where he lived in seclusion until A.D. 2. Returning to Rome, he was adopted as Augustus' heir (A.D. 4) and conducted successful campaigns in Germany, Dalmatia, and Pannonia. In 14 he succeeded Augustus as emperor and endeavored to continue his policies. Tiberius proved a capable administrator; he restored the financial balance of the empire and reformed the tax system in the provinces, but made himself extremely unpopular at Rome by a drastic curtailment of expenditures on public games and other amusements. His private life, especially in his last years, was marked by gross sensual indulgence and by brutal cruelty toward his enemies. In 26 he retired to the island of Capri, whence he conducted the affairs of state by correspondence. For many years the praetorian prefect, Lucius Aelius Sejanus, was his chief minister and confidant, but in 31 the emperor had Sejanus killed on suspicion of conspiracy. Tiberius was succeeded as emperor by Caligula (*q.v.*).

Tibet (*tî-bêt*'), the highest country in the world, situated to the north of India and Nepal between 27° and 37° N. lat. and 78° and 103° E. long. Essentially a vast plateau, Tibet lies at an average altitude of about 16,000 ft. above sea level, surrounded by mountains ranging from 20,000 to 24,000 ft. The area of the country is estimated roughly from 463,000 to 470,000 sq. m. Tibet has four broad physical regions: 1) The



Photo by B. Holmes, courtesy Ewing Galloway, N. Y.
TIBET. RESIDENCE OF THE DALAI LAMA

The citadel of Lamaism is one of the most imposing buildings of all Asia. Until recently, only the faithful were permitted to enter Lhasa, the capital of Lamaism and Tibet

Northern Plains (Chang Tang), with an elevation averaging more than 16,000 ft.; 2) Southern Tibet, consisting of the valleys of the Upper Indus, Sutlej, and Tsang Po; 3) Eastern Tibet, containing the headwaters of the Salween, Mekong, and Yangtze rivers; and 4) the Tsaidam and Koko Nor basins to the northeast.

The climate is severe because of the high elevation, accentuated by violent, biting winds. Below 12,000 ft. the climate is dry and bracing. Annual precipitation is low and averages 8 to 18 in. Most of Tibet lies above the timber line and is generally bleak and barren. Moss, lichen, and grass are the familiar types of vegetation. In the lower valleys to the southeast, various fruits are grown. Barley and buckwheat are the main cereal crops. The yak is the principal domestic animal, supplying milk, meat, butter, wool, and hides. Dried yak dung is a widely used fuel.

The mineral resources are varied. Gold is found in river beds. Precious and semiprecious stones occur in many localities. In the western section of the country, many lakes provide an abundant supply of salt, soda, potash and borax. Radioactive mineral deposits are also reported to have been found in recent years.

The population has been estimated from 3,000,000 to 4,000,000. Tibetans are a Mongoloid people, happy and sociable by nature. They speak a language which is related to the Chinese. Remarkably hardy, they are able to withstand hunger and cold indefinitely if adequately supplied with buttered brick tea, of which they commonly drink 30 to 40 cups a day. Predominantly feudalistic in structure, the society is divided into four broad classes—the landowning nobility, traders, peas-

ants, and herdsmen. Women are accorded a fairly high place in the Tibetan society compared to other Asian countries. Marriage is monogamous, polygamous, and polyandrous, although the first system is predominant. Modern conveniences are absent, and there is almost no education for the masses. However, Tibet has a rich culture of its own. Art is highly developed in the making of tapestries and handmade books and in religious sculpture. Dancing and music are of a high caliber. Excellence in architecture is seen in the construction of monasteries and the Potala—the palace of the Dalai Lama.

Lamaist Buddhism, whose chief feature is a widespread belief in reincarnation, is followed by the vast majority of the people. Many Tibetans carry prayer wheels, spinning them constantly to insure themselves a good place in the life hereafter. Buddhism entered Tibet from India between the 7th and 9th centuries, but it was reformed from within by Tsong-Kha-pa, born A.D. 1358. Two centuries later Sonam Gyatso received from the Mongol chieftain, Altan Khan, the title of Dalai Lama Vajradhara—"The All-Embracing Lama, the Holder of the Thunderbolt." So arose the rule of the priest-kings of Tibet and the Buddhist monkhood so characteristic of the country.

Tibet is still strictly a theocracy, and the administrative positions are largely held by the priests (lamas). At its head is the Dalai Lama, who is the supreme spiritual and temporal ruler. Up until the Chinese Communist occupation, the administration of the country had been conducted by a complex bureaucracy, including the powerful *Kashag* council, which is said to unite the legislative, executive, and judicial functions of government and the *Tsepons* council which controls financial and trade matters. The country is divided into 16 administrative districts, or *dzongs*, each ruled by a governor. The capital city is Lhasa (q.v.).

Tibetan history dates from about 461 A.D. This early kingdom was involved in a long struggle with China in the 8th and 9th centuries, peace finally being made in A.D. 821. Later, Kublai Khan strengthened the authority of the lamas as the ruling power. It was only in the latter half of the 17th century, during the early years of the Manchu Dynasty, that China established her position as a suzerain power. At the end of the 19th century, when Britain and Russia were both extending their influence into Central Asia, the question of Tibet entered the international sphere. In 1902 Russia and China signed a convention which provided that Tibet should gradually be made an autonomous country and that they would undertake to defend Tibet in case of attack. In 1907 an Anglo-Russian convention agreed that both parties would respect the territorial in-

tegrity of Tibet and Chinese suzerainty over it.

China subsequently used force to strengthen its position in Tibet and was driven from the country, which declared its independence in 1913. Tibet thereafter preserved its traditional isolation, although the British exerted some influence in the country, and Tibetan relations with China were improved after 1932. After World War II, the rise of Communism in China constituted a new threat to Tibetan independence, and in 1950 Tibet was forced to concede control of its foreign relations to the Chinese. In succeeding years, China exerted pressure to Communize the Tibetans and recruited Tibetan labor to build roads linking the two countries. Tibetan resistance to such measures finally broke into open rebellion in early 1959, when the Dalai Lama, pursued by Chinese Communist troops, fled the country into India. Meanwhile, the Panchen Lama, second-highest authority in Tibet, headed a puppet government under Communist control.

Tibullus (*tī-būll'ūs*), ALBIUS, Roman elegiac poet, born ca. 54 B.C.; died ca. 18 B.C. A friend of Horace, he was patronized by Messala, an aristocrat whom he may have accompanied on a campaign in Gaul. Two books of his verse were published in his lifetime, and some of his poems may have been included, posthumously, in another book. Much of his poetry concerns his love for women whom he calls "Delia" and "Nemesis."

Tibur (*tī'bēr*). See *Tivoli* (Italy).

Tic Douloureux (*tīk dōō-lōō-rū'*). See *Neuralgia*.

Ticino (*tē-chē'nō*), in French and German, TESSIN, a canton (area, 1,086 sq. m.) of Switzerland, bounded by the cantons of Valais, Uri, and Graubünden, and on the s. by Italy. Its capital is Bellinzona. The majority of Ticino's inhabitants are linguistically and ethnically Italian. The canton was incorporated as a permanent member of the Swiss Confederation in 1803. Population, 1950, 175,520.

Tick (*tīk*), a parasitic arachnid, similar to but larger than the mite (*q.v.*). There are numerous species of ticks, the greater number of which live on the blood of mammals, though some are parasitic on birds. The wood tick and the American dog tick transmit tularemia (rabbit fever) and Rocky Mountain spotted fever, while the cattle tick spreads cattle fever or Texas fever. Domestic animals may be seriously injured or killed by the ear tick. The so-called sheep tick or sheep ked is actually a wingless fly.

Ticknor (*tīk'nēr*), GEORGE, historian, born in Boston, Mass., Aug. 1, 1791; died there, Jan. 26, 1871. A graduate (1807) of Dartmouth Coll., he was admitted to the bar in 1813. After practicing for a year he abandoned law for literature and traveled (1815-19) in Europe, with two years' residence at the Univ. of Göttingen in Germany.

Returning to the U.S., he served (1819-35) as professor of Romance languages and belles-lettres at Harvard Univ. He spent the years 1835-38 in Europe. Ticknor was one of the founders of the Boston Public Library. His chief work is "A History of Spanish Literature" (1849). He also wrote a biography of W. H. Prescott (1864).

Ticonderoga (*tī-kōn-dēr-ō'gā*), a village in Essex County, New York, on the outlet from Lake George to Lake Champlain, 98 m. n. of Albany. Served by the Delaware & Hudson R.R., Ticonderoga has a pencil industry which formerly used graphite from nearby mines; the falls of Lake George provide power for the local paper mill. The village is a popular summer resort. Several engagements of the French and Indian War were fought at Ticonderoga and nearby Crown Point. The place was originally settled in the 17th century by the French, who built (1755) Ft. Carillon, later called Ft. Ticonderoga, and held it successfully against the British in 1758. The next year the fort fell to a British force under Lord Jeffrey Amherst. In an early stage of the American Revolution, the fort was surprised and captured (1775) by a Vermont detachment headed by Ethan Allen. In 1777 Ft. Ticonderoga yielded without a struggle to Gen. John Burgoyne's troops, who abandoned it after the Saratoga campaign; the British occupied the fort briefly again in 1780. Population, 1950, 3,517.

Tides (*tīdz*), the periodic rising and falling of the oceans and the waters connected with them, caused by the attraction of the moon and sun. No satisfactory explanation of these movements of oceanic waters was made until Sir Isaac Newton traced their origin to the law of gravitation, which he discovered in 1666. The tides assume the form of a general wave of water, scarcely

FORT TICONDEROGA, NEW YORK

Courtesy Ewing Galloway, N. Y.



perceptible on the open sea, but rising to considerable heights in the estuaries of rivers and inlets having precipitous banks. They are observed twice in the course of a lunar day, or in 24 hr. 49 min. of mean solar time, and occur 52 min. later from day to day than on the day preceding. The rising of the water is called *flood tide*, and the falling, *ebb tide*. Flood tides and ebb tides follow each other every six hours. The waters remain stationary for a few minutes, when they reach their highest and lowest points, these points being called, respectively, *high water* and *low water*. Gravitation has an equally strong influence upon the land and water, but, since the latter is free to move, it tends to rise under the attraction of the moon and sun as these bodies pass their influence over the surface of the earth as it rotates upon its axis. The water thus drawn by attraction is accumulated in the part of the earth nearest to the moon. That body has an attraction for the bulk of the earth, and, while causing a flood tide on the side of the earth turned toward it, it also causes a flood tide on the opposite side of the earth by pulling it away from the water, although the latter tide is somewhat less perceptible.

The influence of the moon is not instantaneous, but requires a little time to produce full effect, so that flood tides occur a few hours after the moon is on the meridian of any particular place. While flood tides occur on the two sides, those turned to and from the moon, ebb tides occur in the regions situated halfway between them, owing to the waters being necessarily depressed. As the sun is 400 times farther from the earth than the moon, it has a less marked effect, but it tends to increase or diminish the lunar tides according to the position of the moon in the heavens. When the sun and moon act simultaneously on the same hemisphere of the earth, the tidal wave is higher than usual and is called a *spring tide*. However, when the sun and moon are 90° apart, each produces a tide on the portion of the earth directly influenced by it, and the lunar tide at that period is called *neap tide*. Spring tides occur only at new and full moon, and neap tides take place at first and last quarters, the sun being then at quadrature with the moon. When the moon is in perigee, its attraction is stronger, and so the flood tide is higher and the ebb tide is lower than at other times.

The height of tides varies widely, owing to the difference in the depth and size of the water and to the modifications of the contour and outline of the coast. In midocean it is hardly noticeable and rises from a few inches to 3 ft., but, where the moving water comes in contact with a precipitous shore, it frequently piles up many feet in height. This is true especially off

the coasts of continents having shelving bays, deep gulfs, or broad river mouths. The difference between ebb and flood neap tide at New York is about 3 ft. and that of spring tide about 5 ft., while at Boston the difference is about 10 ft. A headland extending into the ocean diminishes the tide, as off Cape Florida, where the average height is only 14 to 20 in. Spring tides in the Persian Gulf and China Seas sometimes rise 30 to 38 ft.; at the mouth of the Severn, 40 to 48 ft.; and in the Bay of Fundy, 65 to 90 ft. A strong wind blowing in the direction of the tide tends greatly to increase the depth of the inflowing water. Where the coasts are low, the tide waters flow inland several miles. Tides are utilized in commerce, since they enable ships to sail up the mouths of rivers and land in many harbors otherwise too shallow for approach.

Tieck (*tĕk*), CHRISTIAN FRIEDRICH, sculptor, brother of the writer and poet Johann Ludwig Tieck (*q.v.*), born at Berlin in 1776; died in 1851. He studied in Berlin with Schadow (*q.v.*), in Paris with David (*q.v.*). During his stay in Italy, he did some noteworthy busts, such as those of Lessing (*q.v.*) and Herder (*q.v.*), and later, when he taught as professor at the Berlin Acad., he did some monumental works for Berlin, such as the statue of Iffland, then one of the foremost theater directors and actors.

Tieck, JOHANN LUDWIG, writer and poet, born in Berlin, Germany, May 31, 1773; died there, Apr. 28, 1853. He studied at the universities of Göttingen, Halle, and Erlangen, and in 1794 settled in Berlin to devote himself to literature. His first essays were published in the *Ostrich Feather Magazine* (*Straussfedern*). On his travels in Germany, he visited Jena (1800), where he formed the friendship of Brentano, Schlegel, and Novalis. In connection with these eminent men of literature, he formed the so-called Romantic School of Germany. He made an extended tour of Italy in 1805, and in 1817 visited England to gather material for his "Shakespeare." From 1819-40 he resided at Dresden, during which period he was most fruitful in his work. While his first novels, "Abdallah" (1796), and a novel in letters, "William Lovell" (1795-96), did not show any specific trends, he soon turned definitely toward Romantic writing, expressing his appreciation of German art of the past, first in such works as "Franz Sternbald's Wanderungen," "Romantische Dichtungen," the dramatic fairy tale, "Fortunat," etc. They are characterized by a deep poetic spirit and fine style, and reflect the power of a vivid imagination. In his versions of old fairy tales he sometimes used the basic story as a vehicle for making allusions to contemporary literature and taste,



Courtesy Underwood & Underwood, N. Y.

TIENTSIN STREET SCENE

thus showing a remarkable gift for satire and wit.

Early in his career, Tieck started translating works from foreign literature; thus his excellent translation of "Don Quixote" (1799-1804) only paved the way for the great literary enterprise which will always keep Tieck's name important, the famous German Shakespeare edition on which he worked with Schlegel (*q.v.*) and which has become a classic in itself. As a critic, his importance is shown in his "*Dramaturgische Blätter*" and "*Kritische Schriften*," which followed the line of critical literary writing which had begun with Lessing (*q.v.*) and Schiller (*q.v.*).

Tientsin (*tīn'tsīn'*), or TIEN-TSIN, a city and river port in Hopei Province, China, at the junction of the Huer and Pei-ho Rivers, 70 m. s.e. of Peking (Peiping). The city is reached by small vessels and is the chief railroad center of China. It has undergone remarkable improvement, especially in its buildings and municipal facilities, within recent years. Formerly it contained only poorly constructed houses of mud and dried brick, but its streets have been macadamized, trees have been planted, and water and drainage systems have been introduced. The streets are lighted and paved and telephone and telegraph connections are maintained with other centers of trade.

Among the principal buildings are a military college, a mint, university, an arsenal, and a number of schools, churches, temples, and missionary stations. The Chinese Mining Co. has its headquarters in the city, its mines being at

Tong Shan, about 180 m. to the north. Much of the machinery for the mines was brought from England and Germany. The city has a large export trade in coal, cotton, peas, dates, rugs, and wool. Clothing, sugar, and machinery are imported. The Italian concession of Tientsin (Sino-Italian agreement of 1902) lies on the left bank of the Pei-ho and has a population of *ca.* 8,000.

Tientsin, the port for the city of Peiping, has been an open port since 1858; the first British consulate in the city was set up in 1861. Telegraph, railway, and other improvements followed. In 1900, Tientsin was captured by the Allies, who used it as a base for operations during the Boxer Rebellion. Again a battleground in 1935, during the Japanese invasion of China, Tientsin fell to the Japanese on Aug. 2, 1937. On Oct. 6, 1945, Japanese forces surrendered Tientsin to U.S. forces, who turned the city over to the Chinese. Population, *ca.* 1,292,000.

Tiepolo (*tyá'pô-lô*), GIOVANNI BATTISTA, painter and etcher, born in Venice in 1696; died in Madrid in 1770. A pupil of Gregorio Lazzarini, he was mainly influenced by the loose, colorful genre paintings of Piazzetta and the magnificent compositions of Paolo Veronese. From 1716 on, he decorated churches and palaces with his frescoes, first in Venice, then in Udine, Milan, and other northern Italian cities. His best-known and most important work is the rich fresco decoration for the staircase and hall in Würzburg Residence (Germany), done in the years 1750-53. In 1762, Charles III commissioned him to make large frescoes for the royal castle in Madrid; this task

he undertook with his two sons, Domenico and Lorenzo. Whether Tiepolo depicted religious or mythological scenes, whether in frescoes, altarpieces, or easel paintings, he had an independent and striking style of his own, characterized by a typical 18th-century attitude and the use of light colors, dominated largely by a glowing blue. Because of this light, fluid manner, his sketches and drawings have great charm, as do his many etchings.

Tierra del Fuego (*tyér' rā dël fwá' gō*), meaning "land of fire," an island group near the southern extremity of South America; it is separated from the mainland by the Strait of Magellan. The archipelago consists of one large island and numerous small islets, the total area being 32,000 sq. m. Tierra del Fuego, the chief island, is 300 m. long and tapers toward the southeast into Cape San Diego. The point farthest south is formed by a small island and is known as Cape Horn. These islands are of volcanic origin. They have a mountainous surface, their peaks ranging from 4,500 to 5,450 ft. above sea level. The line of perpetual snow extends some distance below the summits of the more elevated peaks and vegetation consists principally of stunted forest trees, shrubs, and grasses. These islands have a cold and disagreeable climate. The inhabitants are Patagonians, who subsist by fishing and hunting. Magellan discovered these islands in 1520. Magallanes (Punta Arenas), population ca. 23,000, is the chief town. One-fourth the group belongs to Argentina and the remainder to Chile. Population, ca. 28,000.

Tiffany (*tí'f-ā-ný*), CHARLES LEWIS, jeweler, born Feb. 15, 1812, in Killingly, Conn.; died Feb. 18, 1902, in Yonkers, N.Y. He entered business when he was only 15 as manager of a general store owned by his father. He was so successful in this venture that in 1837 he and another young man, John B. Young, went to New York to open a small store there. Although they began by selling stationery and notions, it was not long before their stock consisted almost entirely of jewelry, china, and glass ware. In 1848, the firm, by then Tiffany, Young, & Ellis, began manufacturing jewelry and also imported jewelry and gems from Europe. In 1853, the firm became Tiffany & Co., and from that time until his death, Tiffany was the leading jeweler in the U.S., famous for the beauty and elegance of the merchandise sold in his store.

Tiffin (*tí'f-in*), county seat of Seneca County, Ohio, located on the Sandusky River 50 m. s. of Toledo, is on the Baltimore & Ohio, Pennsylvania, and New York Central R.R.'s. Among the noteworthy institutions are the Orphans' Home and Heidelberg Coll. Manufactures include forging machines, glassware, grinding

wheels, conveying and elevating equipment, and electric motors. Tiffin was settled in 1820 and incorporated as a city in 1835. It annexed the village of Ft. Ball in 1850. Population, 1940, 16,102; in 1950, 18,952.

Tiflis (*tyě-flyēs'*), now called *Tbilis*, a commercial and industrial city of the Georgian Soviet Socialist Republic and of Transcaucasia, U.S.S.R., on the Kura River. It has good railroad facilities, an airport, and a large trade in raw and manufactured silk, cotton goods, carpets, dried fruits, and merchandise. Among the manufactures are cotton and silk goods, soap, leather, carpets, linens, machinery, and utensils. Modern facilities and buildings have been constructed under the Soviet government. The architecture is a mixture of European and Asiatic plans of construction. Buildings of interest are the Georgian Picture Gallery, the palace of art, the 7th-century Zion Cathedral, the medieval Metekh castle, the Georgian State Univ., the Polytechnic Institute, the workers' technical schools and the government buildings. There are beautiful botanic gardens, warm sulfur springs attracting tourists, and a funicular railway from Tiflis to lofty David's Mount. A large number of the inhabitants are of Armenian, Georgian, or Persian descent. Tiflis was founded in the 5th century. Since then the ancient city, lying on both banks of the Kura River, has been the capital of Georgia. The metalwork of its early inhabitants was greatly admired and employed. Tiflis was destroyed in 1795 by Aga Mohammed Khan, Shah of Persia, and in 1801 became a part of Russia. Today the modernized city of Tiflis continues as an important trade link between Russia and Iran. Population, ca. 525,000.

Tiger (*tí'gēr*), a powerful carnivorous mammal of the cat family, about 8 ft. long and 3 to 4 ft. high. An adult tiger weighs about 500 lbs. The front feet have five toes and the hind feet four, and all are characterized by strong retractile claws. The color is tawny yellow above and white beneath, with vertical black stripes on the body and black rings on the tail. It is able to swim with ease and frequently crosses rivers and inlets. The tiger is found in the region of Asia lying east of the Caucasus and south of central Siberia, but is most numerous in the swamps and grassy plains along the shores of great rivers, especially in India, Sumatra, and Java. Its voice is a loud grunting sound, being hardly comparable to the loud roar of the lion. It is very active and graceful and exercises fierce cunning in the capture of its prey.

Tigers lie in wait near brooks or other places frequented by animals, and spring forward with remarkable certainty to grasp and tear the prey to pieces. They are more feared by the natives than the lion, being more active and cunning.

STATE FLAGS AND FLOWERS I



ALABAMA
Cotton State



Goldenrod



ARIZONA
Grand Canyon State



Saguaro Cactus



ARKANSAS
Wander State



Apple Blossom



CALIFORNIA
Golden State



Golden Poppy



COLORADO
Centennial State



Rocky Mountain Columbine



CONNECTICUT
Nutmeg or Constitution State



Mountain Laurel



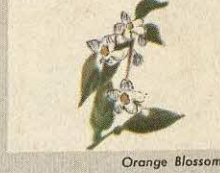
DELAWARE
Diamond State



Peach Blossom



FLORIDA
Sunshine State



Orange Blossom



GEORGIA
Cracker State



Cherokee Rose



IDAHO
Gem State



Syringa



ILLINOIS
Prairie or Sucker State



Native Violet



INDIANA
Hoosier State



Zinnia



IOWA
Hawkeye State



Wild Rose



KANSAS
Sunflower State



Native Sunflower



KENTUCKY
Bluegrass State



Goldenrod



LOUISIANA
Pelican or Creole State



Magnolia

STATE FLAGS AND FLOWERS II



MAINE
Pine Tree State



Pine Cone and Tassel



MARYLAND
Old Line State



Black-eyed Susan



MASSACHUSETTS
Bay State



Mayflower



MICHIGAN
Wolverine State



Apple Blossom



MINNESOTA
Gopher State



Moccasin Flower



MISSISSIPPI
Bayou or Magnolia State



Magnolia



MISSOURI
Show-Me State



Hawthorn



MONTANA
Treasure State



Bitterroot



NEBRASKA
Cornhusker State



Goldenrod



NEVADA
Silver or Sagebrush State



Sagebrush



NEW HAMPSHIRE
Granite State



Purple Lilac



NEW JERSEY
Garden State



Violet



NEW MEXICO
Sunshine State



Yucca Flower



NEW YORK
Empire State



Rose



NORTH CAROLINA
Tarheel State



Dogwood



NORTH DAKOTA
Sioux or Flickertail State



Wild Prairie Rose



ANCIENT TIGER TRAP

Engraving by Pietro Santi Bartoli (1635-1700) depicting a scene from a fresco in an ancient Roman tomb

Bengal tigers are the best representatives of the species, and *man-eating tigers* are the old and nearly toothless specimens, finding man a favorite prey. The female is somewhat smaller than the male, and differs from it in not having a long growth of hair on the cheeks. Tigers are caught alive in various ways. One method described by ancient writers was that of exposing a mirror within a room, near the door. A tiger on the outside, seeing its image in the glass, was enticed into the room by thinking it another tiger, and was caught by the dropping of a trapdoor. The Romans caught tigers in large numbers and brought them to the gladiatorial fights in Rome.

Tiger Cat (*tī'gēr kāt*), the name commonly applied to any wild cat of large size, especially if it has some resemblance in form and markings to the tiger. The name is frequently given to the chati of South America, the marbled cat of the Himalaya, the ocelot (*q.v.*), and the serval (*q.v.*). See also *Cat*.

Tiglath-Pileser (*tīg'lāth-pī-lē'zēr*), the name applied in the Scriptures to several kings of Assyria. Tiglath-Pileser I began to rule about 1120 B.C. Under this ruler the dominion of Assyria was enlarged by adding to it the region now embraced in Armenia, Kurdistan, Persia, Cappadocia, and a part of Syria. However, Tiglath-Pileser III, who reigned from 745 until 727 B.C., was the most powerful of this dynasty. During his sway Babylonia was made a part of his realm and he sent expeditions against the Medes and Syrians. He is referred to in the Old Testament as Pul and it is related that he aided Ahaz, King of Judah (2 Kings 16:7). After his campaign in Palestine he proceeded to Babylonia to quell difficulties, and, in 728 B.C., he was crowned as king of the Babylonians. He was succeeded by his son, Shalmaneser IV. See also *Assyria*.

TILDEN

Tigris (*tī'grīs*), the second river of Western Asia, which rises on the southern slope of the Anti-Taurus Mts., near the upper course of the Euphrates. It receives the Bitlis River at Tilby and joins the Euphrates at Korna, about 100 m. from the Persian Gulf, the united streams being known as the Shat-el-Arab. The general course of 1,175 m. is toward the southeast and almost parallel to the Euphrates, Mesopotamia lying between the two rivers. It is navigable for light freight-bearing steamers to Bagdad and for smaller vessels to Mosul. The upper course is a rapid stream, bringing down large quantities of silt. It was the great channel for commercial navigation in ancient Assyria and on its banks were the cities of Nineveh, Ctesiphon, and Seleucia. The most important cities on the Tigris at present are Bagdad, Mosul, and Diarbekr.

Tikal (*tê-kāl'*), an ancient city of Yucatan Province, Mexico, about 40 m. s. of Merida. It dates from the First Empire of the Mayas, but was abandoned about the 7th century. The remains are among the finest in Yucatan.

Tilden (*tīl'den*), SAMUEL JONES, politician, born in New Lebanon, N.Y., Feb. 9, 1814; died Aug. 4, 1886. He studied at Yale Univ. and the Univ. of New York, but did not complete his course on account of ill health. Subsequently he was admitted to the New York bar, where he became famous as a corporation counsel and amassed a large fortune. He was elected to the New York legislature in 1845. During his term of office he became a leader in canal construction and other improvements, and the following year was a member of the state constitutional convention. As a leader of the New York Democrats, he opposed the Tweed ring in 1871, and in 1874 was elected governor of the state by 50,000 majority, serving in that office until 1877. At that time the beautiful state capitol building at Albany was begun.

The Democrats nominated Tilden for President in 1876 against Gov. Hayes (*q.v.*), of Ohio. At the election the country outside of South Carolina, Florida, and Louisiana gave the two candidates about the same number of electors, and the Democrats laid claim to a majority in these states. However, the Republicans claimed the election for Hayes, who was afterward seated by an electoral commission of 15 named by Congress. The commission was constituted of eight Republicans and seven Democrats and by a strict party vote gave the decision in favor of the Republican candidate, admitting 184 votes for Tilden and 185 for Hayes. Of the popular votes as counted, Tilden received 4,284,265, and Hayes 4,033,295. Tilden became known as the Sage of Gramercy Park, continuing an influential adviser and prominent counsel, but declined the



SAMUEL J. TILDEN

nomination for President in 1880 and 1884. He made a gift of \$4,000,000 at his death to found a free library in the city of New York, donating his private library of 15,000 volumes to begin the collection. A number of heirs contested the will, although Tilden had drawn it up himself, and after long litigation a compromise was made in 1894, and the gift was reduced to \$2,250,000. In 1895 the Astor and Lenox libraries were united with that established by Tilden, to form what is now known as the New York Public Library with the Astor, Lenox, and Tilden Foundations. Tilden never married.

Tilden (*tīl'dēn*), WILLIAM TATEM, JR. (or 2ND), tennis player, born in Germantown, Pa., Feb. 10, 1893; died in Hollywood, Calif., June 5, 1953. A graduate (1922) of the Univ. of Pennsylvania, he won the U.S. tennis singles championship eight times (1920-26, 1929) and the British singles championship three times (1920-21, 1930). He was the outstanding performer on the American team which won the Davis Cup in 1920 and was largely responsible for keeping the cup in the U.S. through 1926. In 1930 he turned professional and won the professional singles championship in 1931 and 1935. In 1945, at the age of 52, he won the professional men's doubles championship with Vincent Richards. Tilden wrote a number of books on tennis and an autobiography.

Tile (*tīl*), a piece of ceramic (*q.v.*) material shaped to required size, thickness, and contour and baked to produce a strong, durable material. Tiles differ widely, according to the many uses for which they may be intended. *Floor and wall tiles* are small surfacing units, made in a large variety of body compositions, sizes, shapes, colors, and glazes. They are used largely for decorative and sanitary purposes in surfacing the interior and exterior walls of buildings, and for floors, ceilings, mantels, and hearths; they are also used in the construction of subways, swimming pools,

TILLY

and pavements. Most floor tiles are unglazed and are hard fired to withstand abrasive wear; most wall tiles are glazed. *Drain tiles* are cylindrical; the commonest are 12 in. long, but the larger sizes are 2 ft. long. Small drain tiles, ranging from 3 to 12 in. in inside diameter, are made chiefly of clay; larger tiles, from 15 in. to 3 ft. in diameter, are now frequently made of concrete. *Roof tiles* are made of clay and overlap each other like slates.

Till Eulenspiegel (*tīl oi'len-shpē-gel*). See *Eulenspiegel, Till*.

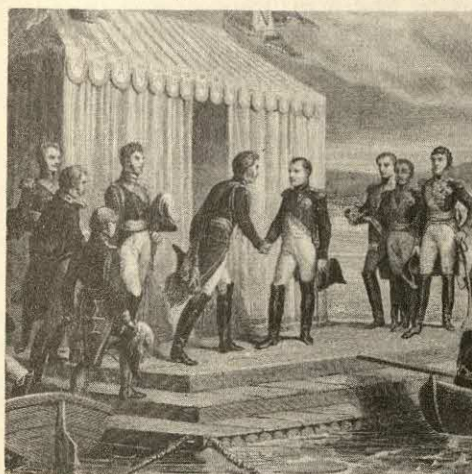
Tilley (*tīl'ē*), SIR SAMUEL LEONARD, statesman, born in Gagetown, N.B., Canada, May 8, 1818; died in St. John, N.B., June 24, 1896. In 1850 he was elected to the New Brunswick legislature as a Liberal, and in 1861 he became premier of the province. Tilley was a prominent figure at the Quebec Conference (1864), where plans for the confederation of Canada were discussed, and at the Westminster Conference (1866-67), which drafted the provisions of the British North America Act. He served in several cabinets, and as minister of finance (1878-85) he drafted a protective tariff plan which became the basis of Canadian financial policy for the pre-World War I era. Tilley was lieutenant governor of New Brunswick from 1885 until 1893.

Tillman (*tīl'man*), BENJAMIN RYAN, politician, born in Edgefield County, S.C., Aug. 11, 1847; died in Washington, D.C., July 3, 1918. A farmer during the difficult Reconstruction period, he became spokesman for the back country against the so-called Bourbon aristocracy, which dominated South Carolina politics. In 1890, with the support of the Farmers' Assn., which Tillman organized, he was elected governor of South Carolina and was re-elected in 1892. For a number of years he ruled the political fortunes of his state, dominating the state constitutional convention (1895), which adopted discriminatory measures against Negro voting. Tillman was elected to the U.S. Senate in 1895 and three times thereafter.

Tilly (*tīl'ē*), JOHANN Tserclaes, COUNT OF, general, born in the castle of Tilly, near Gembloux, Belgium, in February 1559; died in Ingolstadt, Bavaria, April 30, 1632. The younger son of a noble family of Brabant, he began his military career fighting under the Spanish in the Netherlands and served (1600-02) against the Turks in Hungary. In 1610 he was made field marshal and commander of the Bavarian army, under Maximilian I. At the beginning of the Thirty Years' War (*q.v.*) Tilly commanded the forces of the Catholic League; he defeated the Bohemian army at the battle of White Mountain, near Prague (1620), later subduing all of Bohemia. In 1622 he conquered the Palatinate. He defeated Christian of Brunswick at Stadtlohn (1623) and Christian IV of Denmark at Lutter am Barenberge (1626). In 1630 Tilly succeeded Count Wallen-

stein (*q.v.*) as generalissimo of the imperial army. In 1631 he stormed Magdeburg; in the ensuing massacre some 30,000 of the city's inhabitants lost their lives. Later in 1631 Tilly was thoroughly defeated by the Swedish king Gustavus II (*q.v.*) at Breitenfeld. He was forced to retreat across the Lech River in Bavaria. Tilly was mortally wounded in a battle with Gustavus Adolphus at the Lech on April 15, 1632. One of the great military leaders of the Thirty Years' War, he was victorious in 36 consecutive battles.

Tilsit (*tīl'sīt*), in Russian, *soversk*, a city in the Russian S.F.S.R., formerly in East Prussia, Germany, on the Niemen River, 30 m. N.E. of Kaliningrad (Königsberg). Manufactures include paper, lumber, iron, machinery, and foodstuffs. Tilsit developed around a castle built (1408) by the Teutonic Knights and was chartered (1552)



NAPOLEON I AND ALEXANDER I AT TILSIT, 1807

as Tilsē. In July 1807, after the battle of Friedland, France signed a peace treaty here with Russia and Prussia, by which Prussia was stripped of almost half her territories. In World War II the city was occupied by Russian troops (1944). The Potsdam Conference assigned it to the U.S.S.R. (1945), but its final disposition was left to a future peace conference with Germany. Population, *ca.* 60,000.

Tilton (*tīl'tūn*), THEODORE, journalist, born in New York City, Oct. 2, 1835; died in Paris, France, May 25, 1907. He became nationally known in 1874 when he brought suit against the famous clergyman Henry Ward Beecher (*q.v.*), accusing him of adultery with Mrs. Tilton. The trial (1875) lasted six months and resulted in a disagreement of the jury.

Timber (*tīm'bēr*). See *Lumber*.

Timber Line. See *Forest*.

Timbuktu (*tīm-būk-tōō'*). See *Tombouctou*.

Time (*tīm*), the category within which all

events happen successively. Together with space (*q.v.*), it represents the only concept by which the human mind can perceive and order the world. As with space, the idea of time has always occupied the philosophers, and almost every one of them has developed his own concept. In any case, there exist two different concepts of time. One is a finite period of time; past, present, and future. It is often called perceptual or subjective, *i.e.*, time as it appears to us. However, there exists also an objective time, within which all periods of time are included and within which certain relations can be objectively stated. See also *Standard Time*.

Timgad (*tīm'gād*), a ruined city in northeastern Algeria, *ca.* 20 m. S.E. of Batna. Called the Pompeii of North Africa, it contains extensive ruins of Roman architecture, including a theater, a library, a triumphal arch, a citadel, baths, and several temples and churches. The city was founded (A.D. 100) by the emperor Trajan and flourished until the Roman decline, known variously as Thamugadi, Thamugadis, or Thamugas. Following Vandal raids and Berber insurrections, it was found in ruins by a Byzantine general A.D. 535; rebuilt, it flourished again until the Arabs conquered the region in 647. Thereafter Timgad was virtually forgotten until the 19th century, when the French began to excavate the ruins.

Timișoara (*tē-mê-shwā'rā*) or TEMESVÁR, a city in Rumania, capital of Banat province, 37 m. S. of Arad. The city is a major commercial and trading center, with manufactures of textiles, electrical equipment, railroad cars, furniture, and chemicals. It is an episcopal see of the Roman Catholic and Orthodox churches, and has a university (founded in 1945), a polytechnical school, and other institutions of higher learning. An ancient Roman settlement, Timișoara was sacked by the Mongols (1242) and taken by the Turks (1552). In 1781 it was made a Hungarian free city, and passed to Rumania in 1920. In World War II it was briefly occupied by Hungarian troops (1944). Population, 1948, 111,987.

Timmermans (*tīm'mēr-māns*), FELIX, novelist, playwright, and poet, born in Lier, Belgium, July 5, 1886; died there Jan. 24, 1947. He was self-educated and wrote in Flemish, designing and illustrating his own books. His most successful work is "Pallieter" (1916; Eng. tr. 1924), a Rabelaisian novel about a lusty Fleming. Other works include "Droll Peter" (1928; tr. 1930) and "The Harp of Saint Francis" (1932; tr. 1949).

Timmins (*tīm'inz*), a town in eastern Ontario, Canada, on the Mattagami River, about 135 m. N. of Sudbury. It is the trading center of a rich gold-mining district and has manufactures of lumber, pulp, and paper. Population, 1951, 27,743.

Timoleon (*tī-mō'lē-ōn*), statesman and general, born in Corinth, Greece; died ca. 337 B.C. In 344 he was sent from Corinth to aid the citizens of Syracuse in Sicily in their struggle against the tyrant Dionysius the Younger and his allies. Timoleon drove Dionysius from the city, established a democratic government, and brought in new Greek colonists. The Carthaginians, alarmed at the reviving power of Syracuse, sent a large force to subdue all of Sicily. Timoleon defeated them (ca. 339) and concluded a peace which established the boundary between Greek and Carthaginian holdings in Sicily.

Timon of Athens (*tī'mūn ūv āth'ēnz*), an Athenian noble of the 5th century B.C. He is said to have turned misanthrope when his friends abandoned him after he had lost his wealth. His story is told by Plutarch and Lucian and forms the basis of Shakespeare's tragedy "Timon of Athens."

Timon of Phlius (*fī'ūs*), skeptic philosopher who flourished ca. 280 B.C. He wrote a number of works in prose and verse, including a series of satiric hexameter poems (called "*Silloi*") which ridiculed the dogmatic schools of philosophy.

Timor (*tē'mōr*), an island in the Malay Archipelago, the largest and easternmost island of the Lesser Sunda group, about 700 m. E. of Java. It is about 300 m. long and ranges in width from 10 to 60 m. The surface is chiefly mountainous, of volcanic origin, but there is a large area of fertile land. Among the main products are sandalwood, tea, coffee, sago, copra, and rice. The natives are of Malay and Papuan descent and are predominantly Christian. The western part of Timor (5,765 sq. m.) is part of Indonesia, and the eastern part (7,383 sq. m.) belongs to Portugal. A small exclave on the north shore and several small nearby islands are also Portuguese. The first Europeans in Timor were the Portuguese, who settled in 1520. In 1618 the Dutch succeeded in seizing the western part of the island. The boundary was established by a treaty drawn up in 1860. During World War II the island was occupied (1942-45) by Japanese forces. In 1950 Dutch Timor passed to Indonesia. The capital of Portuguese Timor is Dili; the chief town of Indonesian Timor is Kupang. Population of Portuguese Timor, 1950, 442,378; of Indonesian Timor, ca. 350,000.

Timorlaut (*tē'mōr-lout*), in Dutch, TIMOR-LAOET, name of the two largest islands—Jamdena (1,151 sq. m.; pop., ca. 15,000) and Selaroe (ca. 200 sq. m.; pop., ca. 5,000)—in the Tanimbar Islands, a group of about 66 islands (pop., ca. 30,000) in the Malay Archipelago, ca. 300 m. N.E. of Timor, belonging to Indonesia. The inhabitants, mostly Malaysians and Negritos, produce copra, tortoise shell, and sago. The administrative capital is Saumlakki, at the southern end of Jamdena.

Timoshenko (*tē-mō-shēn'kō*), SEMYON KON-

STANTINOVICH, military commander, born in Furmanska, Bessarabia, Russia, Feb. 18, 1895. In World War I he served in the Imperial Russian Army, but joined (1917) the forces of the Revolution and distinguished himself (1917-20) as a cavalry commander. He commanded Russian forces in Poland (1939) and in the Finnish campaign (1939-40). In 1940 he was made a marshal, and commissar of defense in 1941. After the German invasion, he was commander in chief of the western (central) front for a short time and then held other command positions; he was awarded many high war decorations. He was a member of the Central Committee of the Communist party, 1939-52, and later a member of the Supreme Soviet, as well as of the Ukrainian S.S.R.

Timotheus (*tī-mōth'ē-ūs*), general and statesman, died in Chalcis, Greece, ca. 354 B.C. In 378 B.C. he headed an Athenian naval expedition around the Peloponnesus and won over Corcyra (Corfu) to Athens. After a brief period in the service of Persia he returned to Athens; between 365 and 362 he captured Samos from the Persians and extended the Athenian dominion in the Thracian Chersonese. In the Social War (357-55), Timotheus, Iphicrates, and Chares shared the command of the Athenian fleet. Because of stormy weather the first two refused to join an engagement with the enemy fleet in the Hellespont. Chares pressed the attack alone and lost many ships. Later Chares accused his colleagues of treachery. Convicted and unable to pay a large fine, Timotheus went into exile and died shortly afterward in Chalcis.

Timothy (*tīm'ō-thy*) or TIMOTHEUS, a disciple of Paul, born in Lycaonia, Asia, of a Greek father and a Jewish mother. He became converted to Christianity at the time Paul visited Lystra and afterward accompanied the apostle on some of his travels. Timothy served on important missions in connection with the preaching of Paul. His name and that of Paul are associated in the opening of the Second Epistle to the Corinthians, both epistles to the Thessalonians, and those addressed to the Colossians and Philipians. His death, which is commemorated on Jan. 24, occurred in the reign of Domitian. According to tradition, Timothy was the first bishop of Ephesus, and it is asserted that he suffered martyrdom under Domitian.

Timothy, EPISTLES TO, two epistles in the New Testament, following Thessalonians and called, with Titus, the Pastoral Epistles. In them, the apostle Paul offers Timothy advice on governing his church. The apostle's authorship of these epistles has been questioned, but most authorities see his hand in portions of them.

Timrod (*tīm'rōd*), HENRY, poet, born in Charleston, S.C., Dec. 8, 1829; died in Columbia, S.C., Oct. 6, 1867. He studied at the Univ. of

Georgia and also received an education in law. Timrod was war correspondent for the *Charleston Mercury* and in 1864 became assistant editor of the *South Carolinian* at Columbia. Most of his poems were published in the *Southern Literary Messenger* or its successor, *Russell's Magazine*. In most of his poetry he was too dependent upon such superficial aspects as meter and rhyme to reach the qualities of sincerity and straightforwardness he might otherwise have attained. He was in poor health most of his life and never recovered from the loss of his business when Columbia was overrun by Gen. Sherman. His poems were collected in 1873 by P. H. Hayne and later published in a memorial edition.

Timur (*tīmūr*) or TAMERLANE, Mongol conqueror, born near Samarkand, central Asia, ca. 1336; died in Atrā, Mesopotamia, Feb. 17, 1405. The son of a tribal leader, he claimed descent from Genghis Khan. In 1360 he was made chief of his tribe. Embarking on a career of conquest, he subdued neighboring tribes until, by 1369, he was the unchallenged ruler of an area roughly comprising Russian Turkestan, with his capital at Samarkand. He then entered on a campaign against Persia and, by 1387, had in his possession the lands extending east of the Euphrates River to India. In 1392 he crossed the Euphrates and invaded Mesopotamia, then Syria and Russia, conquering the lands between the Caspian and Black

seas. Turning eastward (1398), Timur invaded India along the route of the Indus River. He captured Delhi with enormous slaughter, leaving the skulls of 80,000 of its defenders piled up before the city, and advanced as far as the Ganges. From 1400 to 1403 he waged war against the Ottoman Turks, whose sultan Bajazet I he defeated and captured (1402) at Angora (Ankara). Turning eastward once more, Timur organized an invasion of China, but died before it got under way. He was buried at Samarkand; his skeleton, found in a deep crypt, was recently identified by archaeologists. Though a cruel tyrant, he patronized science and art and constructed vast internal improvements.

Tin (*tin*), a metallic chemical element (atomic number, 50; atomic weight, 118.7; symbol, Sn). It is silvery-white in color in its stable form. The only workable ore of tin is the dioxide, called *cassiterite*. A heavy mineral, cassiterite is readily mined by hydraulic methods. Since much of the tin in the Far East is alluvial, it is mined in this way. Bolivian tin occurs mainly in veins and is mined by open-cut methods. The ore is concentrated, usually by the gravity method, and is roasted to remove sulfur, arsenic, and antimony. The roasted ore is mixed with coal or charcoal and smelted in a reverberatory furnace. Molten tin is collected in a "settler" while the slag overflows into a pot and is resmelted. Some tin-smelters employ a water-jacketed blast furnace similar to those used for lead ores. The smelted tin is purified by letting it run molten down the inclined hearth of the reverberatory furnace. The dross is then skimmed from the surface of the collecting pot. Tin may also be purified by electrolysis. The refined metal is cast into blocks, called *block tin*.

Pure tin melts at 232° C. It burns with a brilliant light when raised to a white heat, and at 100° C. it becomes sufficiently ductile to be drawn into wire. Air at ordinary temperatures does not affect it, but it absorbs oxygen when melted and may be converted into the dioxide by stirring when molten. A bar of tin produces a peculiar noise when bent, due to the sliding of the crystals over one another. The sound thus produced is called the *cry of tin*.

Tin is probably one of the earliest known metals. The Phoenicians mined it in Sicily and the Romans in Spain and Cornwall (England). The principal tin mines are in Malaya, Indonesia, Bolivia, China, and Nigeria. Large deposits of native dioxide occur in Czechoslovakia, Germany, Bolivia, Australia, and the Malay Peninsula. Limited quantities are obtained in a number of the states of the U.S., particularly in California and Missouri, but the tin used in the U.S. is mostly of foreign origin.

Tin is a highly useful metal, being employed



TIMUR

From a contemporary manuscript

in the manufacture of tinfoil, type metal, chemical manufacture, glazes, lining for pipes, etc. It has an important use for tinning iron and copper, which is done by dipping the perfectly clean objects into a bath of molten tin. Its resistance to the action of vegetable acids renders it of economic value in coating utensils. A number of alloys of tin are utilized, such as plumbers' solder, which is an alloy of tin and lead, and gun metal, bronze, and bell metal, which are alloys of tin and copper. Tin may also be alloyed with aluminum, silver, nickel, and antimony. Tin plating is applied by an electrolytic process.

Tinder (*tin'dēr*), a material used for kindling fires before the invention of matches. It is made of half-burned linen, partially decayed wood, and certain fungi, the last named furnished the so-called *German tinder*. In kindling fires with tinder, it is necessary to have materials that cause sparks by striking, such as a piece of steel with a flint, and the spark is made to ignite the tinder, which in turn inflames a match dipped in sulfur.

Tintoretto (*tēn-tō-rēt'tō*), Italian painter, born in Venice, Italy, in 1518; died there in 1594. He

was the son of a dyer (*tintore*), hence was called Tintoretto (little dyer), his real name being Jacopo Robusti. He first studied under Titian, but soon began to paint independently, and may be said to have acquired skill in his profession by his own efforts.

Following his motto, as he had it inscribed over his studio—"Michelangelo's design and Titian's color"—he did intensive anatomical studies from antique sculptures, tried to explore the variety and richness of colors, light and shadow at different times and places, etc., endeavors which are all well reflected in his works, in which he mastered composition, drawing, and color equally. Although educated in strict Renaissance tradition, Tintoretto definitely represents the Baroque (*q.v.*) style in Venice, making use of all the richness of movement and depth, light and color in his sometimes grandiose compositions. Besides many portraits and figure compositions of members of Venice's nobility and clergy, there are his great religious, mythological, and historical paintings—easel and fresco paintings—which have been preserved and which prove his strong temperament and artistic personality. Among his most famous religious paintings are: "The Last Supper," "The Slaughter of the Innocents," "The Wedding at Cana," "The Worship of the Golden Calf," and among the mythological paintings, "Forge of Vulcan" and "Venus." His "Paradise," one of the largest paintings—as to canvas covered—by one of the great masters, and the cycles of frescoes he did for the school of San Rocco, Venice, although rather darkened by age nowadays, with their warm glowing colors belong to the most outstanding of his murals.

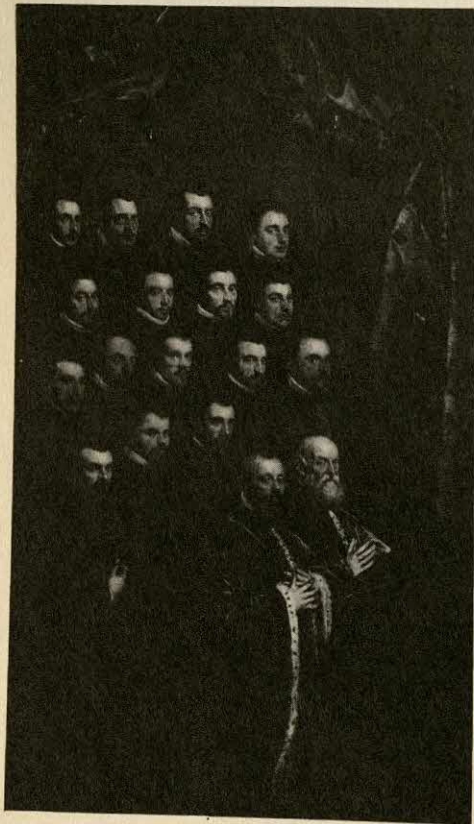
Besides the importance of Tintoretto as one of the representatives of Italian Baroque style in painting, he is closely connected with the art of El Greco (*q.v.*), whose teacher he was.

Tippecanoe (*tīp-ĕ-kā-nōō'*), a river in northern Indiana, which rises in Lake Tippecanoe and flows 200 m. in a southwesterly direction to join the Wabash about 7 m. N. of Lafayette. The river was the site of a battle fought on its banks on Nov. 7, 1811, between the forces of William H. Harrison (*q.v.*), then governor of Indiana Territory, and Indians led by Tenskwatawa, a brother of Tecumseh (*q.v.*), known as the Prophet. Before dawn the Indians attacked Harrison's men, who were encamped within striking distance of their homes; but, after several hours of fighting, the Indians were dispersed and their village was razed. The battle, although not decisive in ending Tecumseh's hostilities against the U.S., brought prestige to Harrison and was the basis for the 1840 Presidential campaign slogan, "Tippecanoe and Tyler too."

Tipoo Sahib (*tē'pōō sū'hīb*) or TIPU SAHIB, sultan of Mysore (India), born in 1753(?);

MEMBERS OF A BROTHERHOOD

Painting by Tintoretto



died in Seringapatam, May 4, 1799. He was the son of Hyder Ali (*q.v.*) and, with his father, constituted one of Britain's greatest rivals for power in India in the 18th century. Trained in European military tactics by French officers in his father's employ, he fought with some distinction in his father's wars against the Maharratas (*q.v.*) and the British and was put in charge of a sizable body of troops when a Mysore war against the British began in 1780. He succeeded his father in 1782 and as maharajah continued the war until 1784. Undefeated, he then concluded a peace treaty with the British and assumed the title of sultan. His invasion of the British-protected state of Travancore in 1789 led to a resumption of the Mysore war in 1790. In 1792 he was defeated by Gen. Cornwallis (*q.v.*) and forced to cede half of his territory to the British and pay an indemnity of 33,000,000 rupees. In 1799, after rejecting a British demand to disarm, Mysore was again invaded by an alliance of British, Maharratta, and Hyderabad troops, and the sultan was killed in defense of his capital.

Tirana (*tê-rä'nä*) or TIRANË, the capital city of Albania, located in the central part of the country in the prefecture of the same name (area, *ca.* 350 sq. m.; pop., *ca.* 60,000). It is the leading industrial and commercial center of Albania; Durrës, its port on the Adriatic Sea, lies *ca.* 20 m. to the west. The city's chief manufactures are cotton textiles, soap, alcohol, cigarettes, and flour and dairy products. Modern government buildings and some mosques dating from the 17th and 18th centuries are among the noteworthy structures. Originally named Teheran, it was founded early in the 17th century by Suleiman Pasha, a Turkish general. It was modernized and expanded after it became the capital in 1920. Population, *ca.* 50,000.

Tire (*tîr*), the hoop forming the tread of a vehicle wheel (*q.v.*). Originally made of wood or metal, tires were later coated with rubber, the resiliency of which reduced the shock from bumps in a road surface. Still later, the pneumatic tire (*q.v.*), using compressed air inside the tire as a shock absorber, was developed and is now used on most vehicles except railroad trains.

Tiresias (*tî-rê'sî-qs*), in Greek mythology, a prophet of Thebes. In the various versions of his story, he was blinded either by Hera, because he took the side of Zeus against her in an argument, or by Athena, who was angered when he chanced to see her bathing. He was given the power to foretell the future either by Zeus or by a repentant Athena and appears as a seer in many Greek myths, including the stories of Hercules and Odysseus. Tiresias, however, is most closely identified with the story of the kingdom

of Thebes, with its tragic ruler, Oedipus, and his ill-fated children, whose sorrows the seer often explained or predicted.

Tirhakah (*tîr-hä'ka*) or TAHARKA, king of Egypt (688-663 B.C.), the third ruler of the XXVth (Ethiopian) Dynasty. Tirhakah commanded the Egyptian army which was defeated by Sennacherib (*q.v.*), king of Assyria, at Eltekeh in 701 B.C. During his reign, he was driven from Lower Egypt by Sennacherib's son and successor, Esarhaddon (*q.v.*). He regained his lost territories from his adversary in 675 but was in turn routed by Esarhaddon's son, Ashurbanipal, in 667. He then withdrew to the dynasty's ancestral city, Napata, in Upper Egypt, where he ruled until his death. Tirhakah is mentioned in the Bible (II Kings 19:9).

Tiridates (*tîr-i-dä'têz*), the name of three kings of Armenia, of whom the following are most noteworthy. TIRIDATES I (reigned A.D. 51-60, 63-?), was made king of Armenia by his brother, a king of Parthia. Driven from the throne by the Romans, he was restored and recognized as king (under Roman suzerainty) by Nero *ca.* 66. TIRIDATES III, called the Great (reigned 259-314), was driven from his throne by the Persians and restored (286) by Diocletian. He was converted to Christianity by St. Gregory the Illuminator and established Christianity as the Armenian state religion in 303. The conversion caused a break between Armenia and Iran and led to a series of religious wars between Armenians and Persians.

Tiridates, the name of three kings of the Arsacid dynasty of Parthia. TIRIDATES I is often confused with Arsaces I, founder of the Parthian empire, who reigned *ca.* 248-211 B.C. He may have been the same person or he may have been the ruler's brother and successor. He is credited with the conquest of Hyrcania (which was absorbed by Parthia) and with successfully resisting attacks by Seleucus II of Syria. Even less is known about most of the other Arsacid kings of Parthia. TIRIDATES II probably reigned *ca.* 32-31 B.C. and 26 B.C. and TIRIDATES III in *ca.* A.D. 36, but neither is fully acknowledged as an actual ruler of the country.

Tirol (*tî'röl*). See Tyrol.

Tirpitz (*tîr'pîts*), ALFRED VON, admiral, born in Küstrin, Prussia, March 19, 1849; died in Ebenhausen, Bavaria, March 6, 1930. Son of a high Prussian official, he entered the navy in 1865 and in 1897 became German navy minister, a post he held through the early years of World War I. By careful maneuvering and planning, he built up the strength of the German navy until it was second only to that of Great Britain. Although he desired to secure Germany's maritime interests and its position as a major European power, he did not favor challenging Britain's

naval supremacy and advocated policies aimed at avoiding the First World War. Once Germany was at war, however, he looked for a prompt naval showdown with the enemy to limit the war's duration and, in 1916, began to argue for unlimited submarine warfare, which ultimately brought the U.S. into the conflict. He



ALFRED VON TIRPITZ

founded the German Fatherland party and was a Nationalist member of the Reichstag (1924-28). His autobiography was published in 1918.

Tirso de Molina (*tēr'sō THâ mō-lē'nā*), pseudonym of GABRIEL TÉLLEZ, dramatist and cleric, born in Madrid, Spain, ca. 1571; died at the Monastery of Soria in Aragon, Spain, March 21(?), 1648. Educated at Alcalá de Henares, he became a Mercenarian friar and rose to positions of authority within the order, serving as superior in the monasteries of Trujillo and Soria and as chronicler of the order (for which he completed a history in 1639). Rated as one of the great playwrights of Spain's golden age, he is credited with producing over 400 plays (of which only some 80 still survive), as well as a number of novellas. His most famous work (1630) is "*El Burlador de Sevilla*" (The Seducer of Seville), which was the first literary treatment of the Don Juan legend. Other of his major works are "*Los Cigarrales de Toledo*" (The Country Houses of Toledo), a collection of stories, plays, and poems resembling the "Decameron"; "*El Castigo del Penséque*" (translated into English as "The Opportunity"); "*El Vergonzoso en Palacio*" (The Bashful Man in the Palace); and "*La Prudencia en la Mujer*" (Prudence in a Woman). His work is distinguished by a sympathetic insight into human behavior, self-restraint, intellectual power, and wit.

Tiryns (*tī'rīnz*), an ancient city of Greece, on the Gulf of Argolis in Peloponnesus, to the east of the city of Argos. Both Greek mythology and archaeological ruins give evidence of the existence and importance of the city in prehistory. In legend, Tiryns was founded by Proetus, a king of Argos, who was supposed to have enlisted the help of Cyclopes in building the city's massive walls (see *Cyclops*). Tiryns is also mentioned in an incidental way in the stories of

Bellerophon, Perseus, and Alcmena, and it is the place where Hercules (*qq.v.*) lived while he undertook his 12 great labors.

Excavations on the site of Tiryns, begun in 1884-85, revealed ruins of several settlements; the earliest, dating back to ca. 3000 B.C., is notable for an impressive circular building. A palace built ca. 1600 B.C. was protected by massive walls of huge, roughly hewn blocks of stone, the so-called Cyclopean walls of legend. These walls also provided fortification for a later palace, built ca. 1300 B.C. and fairly characteristic of the late Minoan civilization (*q.v.*). Tiryns was apparently a city of splendor in 1400-900 B.C. but was later destroyed; on the site was erected a temple-like structure. Later a Byzantine church and graveyard occupied the site, but currently there are only ruins.

Tisa (*tē'sā*), a river of southeastern Europe. See *Tisza*.

Tischbein (*tīsh'bīn*), JOHANN HEINRICH, painter, born in Haina, Thuringia, Oct. 3, 1722; died in Kassel, Hesse, Aug. 22, 1789. He studied with Piazzetta, a well-known baroque painter in Venice, and became court painter to William VIII, landgrave of Hesse-Cassel. His portraits of German nobles are probably his best-known works. Two of his nephews were also painters: Johann Heinrich Wilhelm Tischbein (*q.v.*); and Johann Friedrich August Tischbein (1750-1812), who also specialized in portraiture and was director of the Acad. of Fine Arts in Leipzig.

Tischbein, JOHANN HEINRICH WILHELM, painter and etcher, born in Haina, Thuringia, Feb. 15,



WILHELM TISCHBEIN

Courtesy
The Bettmann Archive

1751; died in Eutin, Schleswig-Holstein, July 26, 1829. A nephew of Johann Heinrich Tischbein (*q.v.*), brother of Johann Friedrich August, and friend of Wolfgang von Goethe, he was the most famous member of his family. His portrait, "Goethe in the Roman Countryside," his engravings of Greek vases from the Sir William Hamilton collection, and his etchings illustrating Homer's works are fairly well known. He has been referred to as Goethe-Tischbein.

Tishri (*tīsh'rē*), the first month of the Jewish calendar, running (by the Gregorian calendar)

from about mid-September to mid-October. The month has 30 days. The Jewish New Year (*Rosh Hashana*, q.v.) is celebrated on the first and second days of the month; the major Jewish holiday, the Day of Atonement (*Yom Kippur*), is celebrated on the tenth (see also *Atonement, Day of*); and the Feast of the Tabernacles (*Suk-koth*), on the 15th day.

Tissaphernes (*tis-g-fár'nēz*), Persian satrap and general, died in 395 B.C. One of the chief figures in the reign of Artaxerxes II, he held the command of the Persian army in Asia Minor and the satrapy of Lydia and Caria. Probably because of his own inaction, he lost his command and the Lydia satrapy in 408 B.C. to Cyrus the Younger, brother of Artaxerxes II. When Cyrus organized an army of Greek mercenaries to be used against his brother, Tissaphernes reinstated himself by betraying Cyrus, fighting for Artaxerxes in the battle of Cunaxa (401), and harassing the retreating Greeks. Restored to his former position and power, Tissaphernes attacked the Greek Ionian cities which had sided with Cyrus but was eventually defeated by the Spartans in 395. In the same year, Artaxerxes was induced by the queen mother and several of his officials to order Tissaphernes' execution.

Tisserand (*tēs-rān'*), FRANÇOIS FÉLIX, astronomer, born in Nuits-St.-Georges, France, Jan. 13, 1845; died in Paris, Oct. 20, 1896. He became director of the Toulouse Observatory in 1873, and was a member of expeditions to Malacca to observe the solar eclipse of Aug. 18, 1868, and to Japan (1874) and to Santo Domingo (1882) to observe the transits of Venus. In 1883 he was appointed professor of celestial mechanics at the Sorbonne and in 1892 was made director of the Paris Observatory. He also founded (1884) and edited the *Bulletin Astronomique* and published a number of works in his field, the most important of which was a four-volume treatise reviewing developments in the field of celestial mechanics.

Tissot (*tē-sō'*), JAMES JOSEPH JACQUES, painter and engraver, born in Nantes, France, Oct. 15, 1836; died in Doubs department, Aug. 8, 1902. While he was a student at the École des Beaux Arts, his paintings and etchings of Parisian women and everyday scenes readily became popular. One of his paintings, "The Meeting of Faust and Marguerite," was purchased for the Luxembourg Museum in Paris after it had been exhibited in 1861. He then spent several years in London, where his work was also popular, went to Palestine in 1882, and began his series of water colors on Old Testament subjects and the life of Christ, to which he devoted the remainder of his life. Many illustrations from the latter series, considered the chief work of his

career, are in the Brooklyn (N.Y.) Museum.

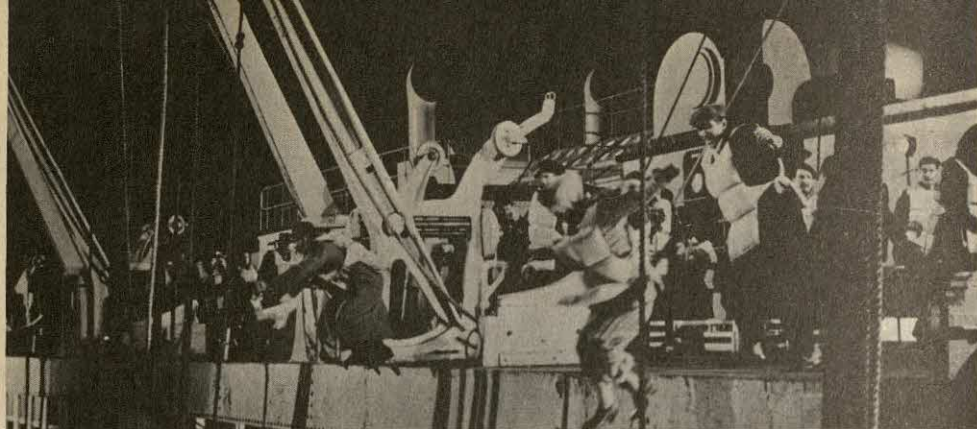
Tissue (*tish'ū*), a structural material in plants and animals. See *Histology*.

Tisza (*tī'sō*) or TISA, a river in southeastern Europe, often referred to as THEISS, its German name. It rises in the Carpathian Mts. and in its 800-m. western and southern course forms part of the border of Rumania with the U.S.S.R. It traverses Hungary and flows into the Danube, of which it is an important tributary, near Belgrade, Yugoslavia. It is navigable for light boats for about 450 m. and abounds in fish.

Tisza, KÁLMÁN, statesman, born in Geszt, Hungary, Dec. 10, 1830; died in Budapest, March 23, 1902. Born into an old Calvinist family, he was privately educated. During the Hungarian uprising against the Austrians in 1848, he obtained a position with the revolutionary government and after its fall worked for the Calvinist Church. He was still concerned with politics, however, and in 1861 was elected to the Hungarian diet and assumed leadership of the more nationalistic of the Hungarian parties. His influence in Hungary and the Austro-Hungarian empire increased over the succeeding years, and in 1875 he became premier of Hungary, a position he held almost continuously for 15 years. Under his leadership, Hungary gained a more dominant role in the empire. He also strengthened the country's finances and introduced compulsory education, but he opposed more radical social reforms. He resigned in 1890. His son, STEPHEN (or ISTVÁN) TISZA (1861-1918), was also premier of Hungary (1903-05 and 1913-17). He opposed the anti-Serbian policy of the government in Vienna, which provoked the outbreak of World War I. His government was overthrown in 1917, and he took a command at the front. In 1918 he was assassinated in Budapest as an alleged instigator of the war.

Tit (*tīt*). See *Titmouse*.

Titan (*tī'tān*), in Greek mythology, one of the ancient race of gods who preceded Zeus and the Olympians as rulers of the universe. Children of Uranus (heaven) and Gaea (earth), the Titans were 12 in number. There were six males, Coeus, Creus, Cronus, Hyperion, Iapetus, and Oceanus; and six females, Mnemosyne, Phoebe, Rhea, Tethys, Theia, and Themis. Feared by their father, the Titans were imprisoned in the underworld along with the Cyclopes and the Hecatoncheires (a race of hundred-handed giants). At the urging of his mother, the Titan Cronus overthrew Uranus and became supreme god. Fearful that his offspring might one day usurp his power, Cronus swallowed all of them except his son Zeus, who was saved by the trickery of Rhea, mother of Zeus. Eventually Cronus was forced to disgorge his children, who joined Zeus in defeating him in a great battle called the



Courtesy Culver Service, N.Y.

THE SINKING OF THE TITANIC

As dramatized in the British film, "A Night to Remember," based on the disaster

Titanomachy, after which the Titans were again cast into the underworld. The story of the Titans and their eventual defeat is often interpreted as referring to a time when the gods of the Greeks supplanted those of earlier civilizations.

The children of the Titans, the best known of whom are Atlas, Demeter, Hecate, Helios, Prometheus, and Zeus, are also sometimes called Titans. See also *Cyclops*; *Giant*; and separate articles on most of the mythological figures listed here.

Titanic (*tī-tān'ik*), a luxury White Star liner, sunk on its maiden voyage from Southampton, England, to New York City. The largest and fastest ship (length, 8,825 ft.; gross tonnage, 46,328) then afloat—and designed to be unsinkable—the *Titanic* struck an iceberg in the Atlantic Ocean south of Newfoundland at 11:40 P.M. on April 14, 1912. It sank 2 hr. and 40 min. later with a loss of 1,517 lives. The ship's distress signal was heard by an eastbound steamship, *Carpathia*, which sped to the scene and rescued more than 700 survivors. Measures to promote safety at sea were strengthened after the disaster.

Titanium (*tī-tā'nī-ŭm*), a metallic element (symbol, Ti; atomic number, 22; atomic weight, 47.90) discovered in 1791, so named for the Titans. Although it was first described by William Gregor, J. J. Berzelius was the first to separate the metal in a state of purity. It was not until 1939, however, that titanium was produced in sufficient purity to be highly ductile and, therefore, useful commercially. The metal is produced by reacting magnesium with titanium tetrachloride, which yields magnesium dichloride and titanium metal. Titanium is lighter than steel and is corrosion resistant. It was formerly used in steels and in pigments as titanium dioxide, but research and development since 1946 have created a number of high-strength alloys for use at low and elevated temperatures. Titanium is employed to some extent in the carbon points of arc lamps and to increase the luster of silver. The metal is found in North America, especially

in Vermont, New Hampshire, and New Brunswick, as well as in Europe.

Tithes (*tīTHz*), a form of tax or contribution amounting to a tenth part of income or property and most commonly used for the support of religious institutions. The name is from the Anglo-Saxon word, *tēotha*, meaning a tenth part. The practice of tithing is very ancient and seems to have been fairly widespread among the early civilizations of the Near East. It is first mentioned in the Bible (Genesis 14:20) when Abraham is described as offering tithes on enemy spoils to a royal priest. Under Jewish law, tithes were levied among the Jews to support the Levites, or priestly class. Early Hebrew kings also exacted tithes for civil purposes, as did the rulers of Babylonia, Persia, and Greece. The custom survived in the Christian Church, at first as a voluntary payment and later by formal legislation. The first religious decree on tithing was made by the Council of Tours in 567, and the first state law was enacted under Charlemagne in the 8th century. In England, the earliest religious decree seems to have been issued in 786 and the first civil law in 1285. A long-standing source of contention between the clergy and the people, tithing is no longer generally sanctioned by national laws. However, certain religious groups, including the Mormons, retain the practice to this day.

Tithonus (*tī-thō'nūs*), in Greek mythology, a brother of Priam, king of Troy and beloved of the goddess Eos. He sired Memnon, the son of Eos, and was granted eternal life by Zeus at the request of the goddess. But she forgot to ask Zeus to give Tithonus eternal youth. After he became helpless in an everlasting old age, the goddess finally changed him into a grasshopper.

Titian (*tīsh'an*) or TIZIANO VECELLIO, the greatest painter of the Venetian school, born in Pieve di Cadore, Italy, in 1477; died in Venice, Aug. 27, 1576. While very young he was strongly interested in painting, and was taken to Venice by his father, where he studied under Giovanni Bellini and other Venetian artists. Giorgione was his

TITICACA

contemporary and friend and the two seem to have worked together for a time after Titian completed his apprenticeship. After helping (1507-08) Giorgione with a series of frescoes for a Venetian building, the Fondaco, Titian undertook three frescoes on the life of St. Anthony for the Scuola del Santo in Padua. In 1516 he succeeded Bellini as official painter of Venice and gained thereby a small annuity and exemption from certain taxes. The basis of his reputation was firmly established two years later, however, when he completed an altar painting, "The Assumption of the Virgin," for the Church of Santa Maria Gloriosa dei Frari in Venice. The painting was much admired, and Titian's services were sought thereafter by the leading families of Italy. He also became a favored painter of the Holy Roman Emperor, Charles V (with whom he spent three years in Madrid), and of the emperor's son, Philip II of Spain.

The great qualities for which the Venetian painters became world famous reached a zenith in Titian's work, with its richness of color, its subtle tonal values, and the movement, drama, and monumental quality of its composition. Titian left a vast array of work, including portraits and paintings on sacred and mythological themes. Among the most famous are "Three Ages" (ca. 1510-12), in Bridgewater House, London; "Titian and His Mistress" (ca. 1511-16) and "Man with the Glove" (ca. 1510-20), in the Louvre, Paris; "Sacred and Profane Love" (ca. 1511-16), in the Borghese Gallery, Rome; "Flora" (ca. 1515-16), in the Uffizi Gallery, Florence; "Assumption" (1516-18) and the "Pesaro Madonna" (ca. 1519-26), in the Church of the Frari, Venice; "Bella" (ca. 1536), in the Pitti Gallery, Florence; "Rape of Europa" (ca. 1559-62), in the Gardner Museum, Boston; and "Pietà" (ca. 1573-76), in the Academy, Venice.

Titicaca (*tê-tê-kü'kü*), the largest lake in South America, located on the boundary of southeastern Peru and western Bolivia, in a high basin between two ranges of the Andes. It is situated at a height of 12,507 ft., and with an area of 3,200 sq. m. it is the highest lake of its size in the world. The lake's average width is 35 m., its depth, ca. 700 ft. The major transportation route between the two countries, the 138-m.-long lake consists of two divisions—Lake Chucuito and Lake Unamarcá, which are connected by the Strait of Tiquina. Drainage is to the south through the Desaguadero River into Lake Poopó. Islands in the lake, and the village of Tiahuanaco, Bolivia, at its southeastern end, contain archaeologically significant ruins, mementos of Inca and pre-Inca civilizations. Steamer routes link Puno, Peru, and Guaqui, Bolivia. For an illustration, see following page.

Titlark (*tü'lärk*). See *Pipit*.



Courtesy Metropolitan Museum of Art, N. Y.

PAINTINGS BY TITIAN

"Filippo Archinto" (above); "Little Strozzi Daughter"



Title (*tî'tî*), in law, the term used to designate ownership of property, based upon all the ele-



Courtesy Grace Line

ON LAKE TITICACA

ments which constitute title to real estate or personal property. It involves the elements of possession and the right of possession, and is based either upon title by descent or by purchase. Inheritance is the single mode of acquiring title by descent, while all other methods refer to title by purchase. However, the death of the owner operates to transfer property in various modes, which may be classed as by will, by descent without will, by occupancy, and by verbal gift, though the amount transferred by the last-mentioned method is limited to personal property.

Title by *purchase* is based upon original acquisition, as by finding or government grant. A person may also acquire title to a property by *lapse of time*, which is based on possession for a certain period of time; by *eminent domain*, such as the taking of land for public use; and by *conveyance*, which is the result of a gift or sale. In the sale of real estate it is essential to examine the title set out in a statement called an *abstract of title*. Such a statement contains a complete history of all the transfers that have been made; it also indicates whether any taxes or assessments are unpaid, what mortgages or judgments affect the title, and the nature of the title of the grantee in the property. An abstract of title is required under the law of England, and it is usually given voluntarily in Canada and the U.S.

The term *title* is applied in legislation to that part of an act by which it is known and distinguished from other acts. It is a requirement in

TITO

most states and countries that the subject of every act be expressed in the title thereof. The term *title* is applied in pleading to the words whereby a particular suit at law is designated. It consists in most cases of the name of the court, the venue, or place of trial, and the parties to the same.

Titles of Honor (*tī'tl̄z of ōn'ēr*), designations by which persons are addressed in consequence of some office or dignity in their possession or inherent in them. They were used to a limited extent among the Greeks, but the Romans bestowed them more freely upon their officials.

The sovereign title of emperor was derived from the Latin *imperator*, an honorific term which the Romans bestowed on a victorious military leader. The title was taken by Augustus Caesar and thereafter by all subsequent sovereigns of the Roman and Byzantine empires. In later times, the title was first conferred on Charlemagne (800), with all later monarchs assuming the title or its equivalent. The German title Kaiser (*q.v.*), however, was derived from Caesar, as was the Russian title Czar (*q.v.*)—both of which correspond to emperor. The term emperor came into use in Russia during the time of Peter I and was used alternately with czar until the fall of the Russian empire in 1917. In addition to titles of sovereignty, minor titles of honor developed during feudal times when knights were regarded as noble and their titles became hereditary. Such titles include those of duke, prince, marquis, archduke, viscount, baron, baronet, and esquire.

Titmouse (*tī't'mous*), the name given in general to birds of the family Paridae, particularly of the genus *Parus*, which includes the species known in North America as chickadees. The family is widely distributed in the Old World but in America does not go south of Guatemala. They are small birds, usually soberly colored, and are active and restless, but friendly. They are hardy, year-long residents even in the northern parts of their range, although some individuals may move farther south in winter. Their voices are simple but not musical. Some species build elaborate nests, but those of the genus *Parus* occupy available cavities in stumps, posts, and such places. There are five to eight eggs, thickly speckled with brown; in some species the eggs are unmarked.

Tito (*tē'tō*), also known as JOSIP BROZ or BROZOVICH, President of Yugoslavia, born in Kumrovec, Croatia, May 25, 1892. The son of a Croatian peasant, he became a revolutionary early in his teens, after he had left his native village to learn the metalworker's trade. Taken prisoner by the Russians in World War I, he became a fervent Communist and lived in Russia for five years, his revolutionary ideas having already been fed by the slavlike conditions in Croatia under

the Austro-Hungarian empire. He returned to Yugoslavia, assumed the common Croatian nickname of Tito as a *nom de guerre* and led worker agitation against the regime. In 1939, after a term in prison (1929-34) and action in the Spanish civil war, Tito was general secretary of the Yugoslav Communist party. That year World War II began, and two years later the armies of Nazi Germany overwhelmed Yugoslavia. Subsequently Tito organized underground partisans who struck out soon after Hitler attacked the U.S.S.R. (1941).

In the course of the war Tito became more popular than Draža Mihailovich, the recognized leader of the Yugoslav nationalists fighting the Axis Powers from the rear. Tito subsequently intrigued against Mihailovich, who lost Allied support and his position as war minister of the Yugoslav government-in-exile. Later, when Tito had established himself as dictator he had Mihailovich arrested, tried, and convicted of alleged collaboration with the Axis Powers during the war. Mihailovich was executed, against the protests of the Western Powers.

In 1945 the end of the Yugoslav monarchy under King Peter was proclaimed, as a government under Tito took over the country. Tito, as a war hero and ruler of a prime Soviet satellite, was a Moscow favorite until 1948, when he committed the heresy of showing independence toward the Kremlin's dictator. He thus inaugurated "Titoism," an international symbol of Communist nationalism and defiance of Soviet totalitarianism. Titoism, in the Yugoslav Communist view, holds that all Communist countries, large and small, are equals, and that their independence must be scrupulously respected; no Communist power should interfere in the internal affairs of another. This view is in direct opposition to the Kremlin dictum that all other Communist countries must attach themselves to the Soviet Union as satellites. The Yugoslav Communists hold also that there is no set formula for converting a country into a Communist state, for the traditions and conditions of nations vary. Moscow and the Communist International, in a bitter war of words and nerves, denounced Tito as a deviationist from Marxism-Leninism and urged internal revolt against his regime.

Tito, who had been hostile to the Western democracies, turned to the West for aid and received it, both in terms of goods and moral support. At the same time, however, Tito was threatening Italy over Trieste (*q.v.*), had jailed (1946) Archbishop Stepinac, the Roman Catholic primate of Yugoslavia, in blind persecution of all religious denominations, and had been responsible for the shooting down (1946) of an American plane, killing five Americans. Relieved by Western aid of the squeeze of the Communist economic blockade, Tito began to collaborate—to a

degree—with the West in world affairs. Internally, as president (elected, 1953), however, he continued to maintain a Communist government with iron-handed, dictatorial rule. See also *Communism; Yugoslavia*.

Titulescu (*tê-tōō-lē'skōō*), NICOLAE, statesman, born in Craiova, Rumania, in 1883; died in Cannes, France, March 17, 1941. Educated in Paris, he returned to Rumania to teach law at the universities of Jassy and Bucharest. He entered politics in 1912, serving thereafter as minister of finance (1917, 1920-22), minister of foreign affairs (1927-28, 1932-36), and minister to London (1922-27, 1928-32). As Rumania's delegate to the League of Nations, he won a reputation as an orator. Titulescu also helped to organize (1920) the Little Entente (*q.v.*). In 1936 his opposition to the Fascist Iron Guard forced his resignation from the government, and in 1940 he fled to France.

Titus (*tī'tūs*), an assistant and disciple of Paul, to whom the latter addressed the Epistle to Titus (*q.v.*), one of the three pastoral epistles of the New Testament. He was born in Greece of Gentile parents and was probably converted at Antioch (A.D. 51) by Paul, whom he later accompanied to Jerusalem (Galatians 2:3; Titus 1:4; Acts 15:16). There, Titus attended a church council at which he and other Gentile converts were exempted from the Mosaic law which required all converts to be circumcised (Galatians 2:3-5; Acts 15:2, 23-29). Well-known as Paul's traveling companion, Titus was sent by Paul to settle a dispute that broke out in the church at Corinth (Galatians 2:1, 3; I Corinthians 4:17, 16:10, II Corinthians 7:5ff.). Paul also assigned him to collect funds for the Christian poor of Jerusalem. Titus was later sent to Crete, where, traditionally, he became the first bishop.

Titus, ARCH. OF. See *Titus (Flavius)*.

Titus, EPISTLE TO, a book of the New Testament, written by St. Paul to Titus. In the letter, which was written during the period of Titus' mission to Crete, the apostle lays down rules of virtuous conduct and warns against false teachers.

Titus (TITUS FLAVIUS SABINUS VESPASIANUS), Emperor of Rome, eldest son of Vespasian, born in Rome, Italy, Dec. 30, 40 A.D.; died Sept. 13, 81. He was brought up at the imperial court, where he became an accomplished scholar. As a youth, he served ably in Germany and Britain, and later commanded a legion under the leadership of his father in Judea. Vespasian became emperor in 69, leaving Titus in Asia to conduct the Jewish war, which ended with the capture of Jerusalem in 70. On his return to Rome, he and Vespasian were given a magnificent ovation. Accorded the title of caesar, Titus became virtual emperor during the remaining nine years of Vespasian's reign. Throughout this period his



TITUS FLAVIUS VESPASIANUS

behavior was marked by a profligacy and cruelty that led to the deterioration of his popularity. With his succession to full control of the throne in 79, however, Titus became the model of a civic-minded emperor. He corrected many abuses in the civil service, erected splendid public buildings, completed the Colosseum (*q.v.*) and public baths, and instituted great public games. During his reign, the eruption of Vesuvius (79) buried Pompeii and Herculaneum (*qq.v.*). He was succeeded by his brother Domitian, who erected the Arch of Titus (81), opposite the Forum, a marble arch 50 ft. high and 46 ft. wide. Its sculptures and reliefs depict the triumphs of Titus, including the plunder of the temple at Jerusalem.

Titusville (*tī'tūs-vīl*), a city in Florida, seat of Brevard County, situated on the Indian River 35 m. E. of Orlando, Fla.; it is served by the Florida East Coast R.R. During the 1880's it flourished as a port, but it later became a center for citrus-fruit packing, its main industry today. Located nearby is the U.S. Air Force Missile Test Center at Cape Canaveral and Patrick Air Force Base (*qq.v.*). The Titusville area serves as a residential district for employees of the missile bases. Population, 1950, 2,604.

Titusville, a city in Crawford County, Pennsylvania, on Oil Creek and served by the Pennsylvania and New York Central R.R.'s. Located 80 m. N.E. of Pittsburgh, Pa., it is the center of a rich farming, dairying, and oil-producing region. Its manufactures include heavy and light machinery and electronic, steel, and petroleum products. The first oil well in the U.S. was drilled here in 1859; its site it now the location of Drake Well Memorial Park. Titusville was settled in 1796 and chartered as a city in 1866. Population, 1950, 8,923.

Tivoli (*tīv'ô-lī*), a town in central Italy in the region of Latium and the province of Roma,

TOADS

about 16 m. E. of Rome; its ancient name was Tibur. It is situated on a height above the falls of the Aniene River. The grandiose past of Tivoli is reflected in the remains of numerous buildings, many dating back to ancient Rome. Most notable are the villas of Hadrian and other Roman emperors, the Temple of Vesta (70 B.C.), and the famous Villa d'Este (begun in 1549) with its beautiful gardens and fountains (for illustration, see *Fountain*). Several of Tivoli's old churches were destroyed in World War II. Population, 1956, 24,932.

TNT (*tē'ēn-tē'*), or TRINITROTOLUENE (also called *trinitrotoluol*), a powerful explosive; chemical formula, $C_6H_2(CH_3)(NO_2)_3$; specific gravity 1.654; soluble in ether, acetone, or alcohol. TNT has been used as a standard military explosive since 1904, in bombs, shells, submarine mines, torpedo warheads, and detonating fuses, and for blasting and demolition work. Though extremely powerful, it is relatively insensitive, a fact which lessens the hazards of its manufacture and handling. It is highly toxic, whether inhaled or absorbed through the skin. It explodes at 240° C., but small quantities will burn without detonating.

Toadflax (*tōd'flākz*), any one of *ca.* 30 plants (*Linaria*) in the figwort family. Herbaceous perennials or annuals of the Northern Hemisphere, they have long clusters of tubular, asymmetrical flowers of various colors, closed at the top like a snapdragon, with a long, slender spur at the base. The common toadflax (the yellow and orange *butter-and-eggs*) is a roadside weed in eastern North America.

Toads (*tōdz*), technically the tailless amphibians belonging to the genus *Bufo*, which can be found all over the world. Toads differ from the true frogs (genus *Rana*) by a thicker body, a warty skin with numerous glands secreting fluids irritating to some animals, and by the absence of teeth. They frequent moist, shady places during the day, coming out at night in search of food, which consists of insects, worms, and small shelled animals. Toads hibernate in a torpid state until warm spring weather begins. They are poor swimmers, and take to water only to deposit their eggs. The eggs, laid in spring, are fertilized externally at the moment of extrusion, and, like those of the frog, are held in a gelatinous tube or envelope. Tadpoles similar to those of the frog soon develop; they become toads after limbs have developed and absorption of the gills and tail has taken place. Toads are useful in gardens for the destruction of insects and grubs, which they catch by suddenly protruding the tongue. Because of their usefulness in insect control, some larger South-American species have been introduced in countries where the toad is not native. Toads are more intelligent than most amphibians and become

quite tame in captivity. Many widely different species have been described.

Tobacco (*tō-bāk'ō*), a widely cultivated plant of the nightshade order, belonging to the genus *Nicotiana*. The stem of the common tobacco plant (*Nicotiana tabacum*) grows to a height of 3 to 5 ft., has broad lance-shaped leaves 5 to 18 in. long, and bears rose-colored and terminal flowers. It has two-celled, five-valved fruits. The stem and leaves are covered with hairs, which are glandular and viscid at the tip. All species possess narcotic properties, for which some are cultivated extensively in the Tropical and Temperate Zones. Tobacco is native to the tropical regions of America, and was unknown in Europe before the discovery of the New World by Columbus. The genus is called *Nicotiana* in honor of the French ambassador to Portugal, Jean Nicot, who helped to popularize the use of snuff in France. It probably came to be called *tobacco* from a Spanish corruption of the native name, *tabaco*, for a Y-shaped tube through which the Carib Indians inhaled tobacco smoke or finely powdered snuff. The use of tobacco was introduced into Europe by the Spanish and Portuguese in the 16th century; Sir Francis Drake (*q.v.*) introduced it into England. The culture of tobacco in the U.S. had its beginnings in the Virginia colony around 1615, when it was recorded that not only the fields and gardens but also the streets of Jamestown were planted with tobacco. It became the staple crop and even the main currency of the colony.



Photo by G. Massie, Mo. State Dept. of Resources & Development

TOBACCO PLANTS

The smoking of tobacco was practiced in America at the time of its discovery, but the plant was first used in Europe in the form of snuff, smoking being introduced later by Sir Walter Raleigh. The use of tobacco was opposed by many priests, sovereigns, and learned men, and the practice was met by the severest opposition. Users of tobacco were tortured in Russia, executed in Turkey, and fined and imprisoned in Switzerland, and Popes Urban VIII and Innocent IX issued bulls against it. James I of England published a proclamation against the use of tobacco, describing it as harmful to the brain, hateful to the nose, dangerous to the lungs, and injurious to the eyes. However, the tobacco habit spread alike to all classes and all countries. The U.S. has come to lead all other nations in tobacco production and consumption, with India as the second.

CULTIVATION. The two classes of tobacco that are most extensively cultivated are the *Virginian* and the *green tobacco*, but allied species have been obtained by propagation. Plants selected for commercial cultivation are judged on two counts: the number and size of their leaves and the hardness of the plant. Seed beds are carefully prepared by burning wood over them. The seeds are sown early in the season in beds, carefully covered at first, and when the young plants are about 4 in. high they are transplanted in a field containing rich soil. Transplanting takes place about the early part of May, this depending upon the latitude and season, since the plants are easily affected by frost. The young plants are placed in the ground in rows about 4 ft. apart, thus facilitating cultivation by machinery. It is necessary to guard against injury by insects, especially the tobacco worm, a caterpillar which is fond of the leaves. The stalks are topped and freed from false leaves or suckers appearing at the bottom, for the purpose of directing the growth of the plant so as to develop the largest leaves possible.

The plants mature in about three months after being transplanted. They are then cut immediately above the ground and hung on long rods in the tobacco barn with heads downward. Harvest time runs from about July 15 to Sept. 15. Tobacco barns, also called curing barns, are constantly heated buildings with the sides and ends open, thus allowing the air to pass through freely. The plants are dried by means of artificial heat, usually 100° F. at first, but later the temperature is raised to 175°. The curing process usually takes about four days and four nights.

Thereafter, tobacco is dried, graded, and trucked to the auction-room floors of the warehouse to be inspected by the buyers before bidding starts. The tobaccos are then sold through an auction system that is both colorful and unique in modern industry. The peculiar cry of the tobacco auctioneer, which sounds like utter gibber-



Courtesy Winston-Salem Chamber of Commerce, N. C.

TOBACCO WAREHOUSE

ish to the uninitiated, has been made known to the U.S. public as the theme of a long series of radio programs. In tobacco centers, such as Durham, N.C., thousands of pounds of tobacco leaf, ranging in quality through scores of grades, are sold at these public auctions in the fall to the highest bidder. The portion having a light and even color is considered of the finest flavor and brings the highest price in the market. When thoroughly dried, the tobacco is crated and transported to the manufacturer.

Tobacco is grown in North America chiefly from Florida to Wisconsin and along the Atlantic coast as far north as New Brunswick. Some tobacco is grown in the southernmost parts of the Province of Ontario, on the north shore of Lake Erie. The work is done largely by Negroes, giving a curiously Southern-American look to these Canadian fields. Some of the leading tobacco-producing states are North Carolina, Kentucky, Tennessee, Virginia, South Carolina, Georgia, Pennsylvania, Wisconsin, Maryland, Ohio, Connecticut, and Florida, the first four out-producing the others by many thousands of pounds annually. However, the finest quality comes from Cuba. Other countries that yield large quantities include India, Japan, Greece, Russia, Germany, France, the Dutch East Indies, the Philippines, Ceylon, Brazil, Puerto Rico, Algeria, Argentina, and Hungary. The average yearly crop of tobacco in the U.S. reaches about 1,900,000,000 pounds.

MANUFACTURE. The manufacture of products from tobacco is one of the great industries, involving a large capital and employing many thousands of people. When taken from the auction sales to the factory the leaves are conditioned with the right moisture content for aging. The aging process, lasting from two to four years, takes place in huge warehouses. When taken to the factory the leaves are cleansed with salt and water and the harsh midrib or stem of the leaf is removed.

The largest and finest cured leaves are set aside for *cigars*. Other grades are used for *smoking* tobacco and for *snuff*. Snuff is made largely of the midrib, and the inferior grades of smok-

ing tobacco are obtained from the smaller leaf ribs and waste in cigar making. *Plug*, or *chewing*, tobacco is manufactured mainly from a middle class of leaves, which are moistened and pressed into cakes or sticks. *Cheroots* are made by rolling leaves in the shape of a slender cone, and *cigarettes*, by enclosing small particles of tobacco in a tubular paper wrapper.

Careful inspection, reconditioning, cross-blending, and shredding by rotary cutting machines are some of the steps preceding actual making of popular tobacco forms, such as cigars or cigarettes. Machines are vital to this industry; among these are the ingenious packaging machines which perform one of the numerous operations necessary in tobacco manufacture. They automatically count out 20 cigarettes, wrap them, fold the package, and put on the U.S. revenue stamp.

It is estimated that the total annual tobacco production of the world reaches 6,653,000,000 pounds. The annual consumption in the U.S. was given at 1,290,000,000 pounds in 1948; the approximate value of production of cigars, cigarettes, and other products was \$641,356,000 in 1947. Large quantities of cigars are smoked in Canada and the U.S., while snuff, cigarettes, and pipe tobacco are used more commonly in Europe. However, since about 1920, American consumption of cigarettes has grown more rapidly than that of the other forms of tobacco. In 1956 the U.S. population (15 years and over) consumed about 3,200 cigarettes per person, compared with about 3,500 in 1953.

Tobacco Nation, or *TIONONTATI*, a tribe of the Iroquoian Indians (*q.v.*). The French, who found them in Ontario, Canada, in 1616, named them the Tobacco Nation because of the considerable amounts of tobacco they raised. Attacked in 1649 by the Iroquois for giving refuge to the Hurons, who earlier had been scattered by the Iroquois, the Tobacco Nation, with the Hurons, fled to the area southwest of Lake Superior. Later, they became a single tribe known as the Wyandot Indians (see *Wyandots*).

Tobacco Worm, an insect which attacks and destroys the leaves of tobacco. It is a large

TOBAGO

green caterpillar, the larva of one of two species of the hawk or sphinx moth (*Protoparce sexta* and *P. quinquemaculata*), but is known as the tobacco worm while in the larval state. The pupa of this insect lies dormant in the ground during winter, and the moth comes out in May or June, when it begins to lay eggs on the underside of the tobacco leaf. As soon as the larvae hatch, they begin to feed upon the plant and, if undisturbed, can do much damage.

Tobago (*tô-bă'gō*). See *Trinidad and Tobago*.

Tobey (*tô'bê*), CHARLES WILLIAM, politician, born in Roxbury, Mass., July 22, 1880; died in Bethesda, Md., July 24, 1953. He was educated at Roxbury Latin School and in 1903 moved to Temple, N.H., where he engaged in farming and became interested in politics. A Republican, he was a member of the state house of representatives and of the state senate; he also served as governor of New Hampshire in 1929-30. In 1933-39 he served in the U.S. House of Representatives and from 1939 until 1953 in the U.S. Senate. He opposed President F. D. Roosevelt's domestic policy but supported the bipartisan foreign policy inaugurated by the Democrats, and he was a member of the U.S. delegation to the Bretton Woods (*q.v.*) conference. Tobey became a nationally known figure during the Senate's crime investigation (Kefauver committee), in 1951, because of the pointed and discerning questions he addressed to the witnesses.

Tobias (*tô-bî'ās*), in theology, an apocryphal figure, originating in Jewish writings of the 3d or 2d century B.C. The son of Tobit, he healed his blind father after an adventurous trip under the guardianship of an angel. It was the gall of a fish which he caught on his journey which healed his father's blindness.

Toboggan (*tô-bōg'an*), a vehicle for coasting upon snow or ice. It differs from a sled in that the bottom is flat and is not provided with runners. Toboggans were used originally by the Indians of Canada to convey dead game over the new snow. They constructed these vehicles of slabs of birch. This mode of construction gave them the advantage of light vehicles that could be pulled easily over loose snow and even over rough ground. Strips of whalebone are used for making toboggans among the Eskimos, and some tribes employ dried bark.

Toboggans for sporting purposes are made chiefly of thin strips of wood, such as ash or maple, and are about 18 in. wide and 6 to 10 ft. long. They carry from two to four occupants. The vehicle is taken to the upper end of a slide-way, consisting of one or more chutes, covered with snow or ice. The speedway is from 500 to 900 yds. long and inclines sufficiently to permit attaining a great speed. In some cities toboggan



TOBOGGANING

slides are constructed in parks for the free use of children, who may use either sleds or toboggans. However, in some localities tobogganing is a private enterprise and those who take part in the pastime pay a small fee.

Tobol (*tô-bôl'y*), a river of Asia, in Western Siberia. It rises in the southern part of the Ural Mts., has a general direction toward the northeast, and discharges into the Irtysh near Tobolsk. The Tobol is about 745 m. long and is navigable about half that distance.

Tobolsk (*tô-bôlsk'*), a city of the Uralsk area in Western Siberia, at the confluence of the Tobol and the Irtysh. It is on a branch of the Trans-Siberian R.R., about 300 m. n.w. of Omsk, and is the center of a large trade in furs, fish, and livestock. It has manufactures of soap, wood products, leather, clothing, cured meat, and ships. The city was founded in 1587, and thus is one of the oldest Russian settlements in Siberia. Tobolsk has an ancient kremlin, an old monastery, and a historical museum. After the Russian Revolution of 1917, the former Czar Nicholas II and his family were imprisoned here (1917-18). The town was later the scene of fierce fighting between the Revolutionists and the forces commanded by Adm. Kolchak (1919). Tobolsk was one of the first places in Siberia to be settled and for many years served as an exile colony. Population of the city, *ca.* 25,000.

Tobruk (*tô-brōōk'*), town located in the province of Derne, Northeast Libya, Africa, on the shores of the Mediterranean Sea. It came into prominence during World War II as the scene of fierce desert warfare, changing hands several times between English and German-Italian forces. Population, *ca.* 1,500.

Tocantins (*tô-kân-têns'*), a river in Brazil, which rises in the government of Goyaz by several branches, and, after a course of 1,700 m. toward the north, flows into the Atlantic by the

estuary of the Pará River. The principal tributary is the Araguayá, which it receives in latitude 6° s. It is 8 m. wide at its mouth, and the tide affects it fully 300 m. from its mergence into the Pará. Boats ascend it for 1,025 m., but navigation is obstructed in several places by extensive falls and rapids, particularly between the Araguayá and the Pará. The valley is fertile and contains fine forests of valuable timber.

Tocqueville (*tōk'vil*), ALEXIS HENRI CHARLES MAURICE CLÉREL, COMTE DE, political theorist and statesman, born at Verneuil, Seine-et-Oise, France, July 29, 1805; died in Cannes, Apr. 16, 1859. He was a great-grandson of Malesherbes, the political writer and magistrate who defended Louis XVI before the Convention. He was admitted to the bar in 1825 and became assistant magistrate at Versailles in 1830. In the following year, he was sent on an official mission to study the penitentiary system of the U.S. Together with his colleague, Gustave de Beaumont, he wrote a report which had a strong influence on prison discipline. Another result of this visit was his famous book, "De la Démocratie en Amérique" (4 vols., Paris, 1835-40, translated into English by Henry Reeve, "Democracy in America," London, 1835-40). An inquiry into the fundamental nature and institutions of democracy, this work was the first political analysis of the democratic system. It attracted great attention in liberal circles, particularly in England. It remains an authoritative work and has been the subject of numerous critical essays. Tocqueville visited England in 1835 and married an English girl.

He was elected to the Acad. of Moral and Political Sciences in 1838 and to the French Acad. in 1841. In 1839, Tocqueville embarked on a political career. He was elected to the Chamber of Deputies as a member for Valognes and after the Revolution of 1848 served briefly as vice president of the Legislative Assembly and minister of foreign affairs. He was opposed to the despotism of Louis Napoleon and after the *coup d'état* of 1851, which introduced the Second Empire, he retired from public affairs and devoted himself to the preparation of another work, "The Old Regime and the Revolution" (1856).

Tocqueville is noted for his enlightened critical approach to an analysis of the causes and results of the democratic system. He asserted that there had been a gradual progress toward the principle of equality in Europe since the age of Louis XIV and that the emergence of the democratic system resulted from historical necessity. In contrast to contemporary historians, he introduced the theory that the French Revolution was not a sudden or complete reversal of the monarchical system, but a logical outcome of a historical movement. In France, the Revolution



ALEXIS DE TOCQUEVILLE

retained and developed many features of the old regime, notably administrative centralization. In the U.S., democracy evolved more rapidly because of the urgency and similarity of colonial problems and Puritan attitudes. Tocqueville maintained a moderate view of democracy, pointing out that liberty must prevail in every sphere of activity as a check to the disadvantages of a democratic system. He believed that democratic equality, acting as a leveler of all barriers, could lead to mass tyranny on the part of the state; he therefore favored the preservation of certain traditional, or aristocratic, elements in the government and the separation of the three main governmental functions.

Todleben (*tōt'lā-ben*), FRANZ EDUARD, general and engineer, born at Mitau, Russia, May 20, 1818; died at Soden, Germany, July 1, 1884. He was descended from German parents, studied engineering at St. Petersburg, and in 1838 entered the army. From 1848-51 he served as a military engineer in the Caucasus, where he defeated a native army under Shamyl. His services in the defense of Sebastopol during the Crimean War made him famous. In 1860, he was made chief of engineers in the Russian Army and in 1878 was given charge of the siege at Plevna, where he captured a large Turkish army under Osman Pasha. After the war he became governor of Odessa, but retired in 1884.

Tody (*tō'dy*), a genus of birds found in the West Indies, related to the bee-eaters and kingfishers. The bill is long and much depressed, the wings are short and rounded, and the tail is quite short. Most of the species are small birds, not more than 3 in. long, and the plumage is richly colored with green and red. The *common green tody* is native to Jamaica. Several species are found in the northern part of South America. These birds frequent damp places, living alone most of the time, and feed upon insects and the

tender part of plants. They are easily approached and caught.

Toga (*tō'ga*), a garment worn by the citizenry of ancient Rome, constituting the principal outer article of attire. Though it differed somewhat at various periods, the general form was semi-circular. One corner of the garment was placed upon the left shoulder, and the remainder was passed behind the body, over the right shoulder, and across the breast. The end was thrown back over the left shoulder. The garment draped nearly to the feet and was slightly higher in the front. The togas worn were of various colors and varying patterns, each having its own significance. After the introduction of the stola (*q.v.*), a garment for women, the toga was worn only by men. Exiles and foreigners were not permitted to wear the garment.

Togo (*tō-gō*), COUNT HEIHACHIRO, admiral, born in Kagoshima, Japan, Dec. 22, 1847; died in Tokyo, May 30, 1934. During the Russo-Japanese War (1904-05), Togo was commander in chief of the Japanese fleet. He had personal charge of the squadron that annihilated the Russian fleet under Adm. Rojzhdestvenski in the battle of Tsushima, May 27-28, 1905. Togo, trained in naval schools in Japan and in England, made a major contribution to the development of Japanese sea power.

Togoland (*tō'gō-lānd*) or TOGO, also known as FRENCH TOGOLAND, a republic in Africa on the Gulf of Guinea, between Dahomey and Ghana. It is 124 m. wide and 372 m. long at its extreme points and covers an area of 21,500 sq. m. The territory has mountains, reaching to a height of 3,300 ft., which divide the country into a northern plain and a southern plateau region; the coastal area has many lagoons. The climate is tropical. The population, which forms a complexity of ethnic groups, is Negro. There is also a small minority of whites, chiefly French.

Lomé, the capital (pop., 1956, 38,921), serves as a port and the center of three railroads (293 m.); it has an airport, which links Togoland with French West Africa and French Equatorial Africa. There are 1,700 m. of roads. Chief products are cocoa, coffee, palm oil and palm kernels, copra, castor oil, shea nuts, peanuts, and cotton fiber. Livestock is raised, and along the coast fishing is a major activity. There is some mining of phosphates, iron ore, chromite, and bauxite.

Originally a German protectorate during the 19th century, when the European powers divided spheres of influence in Africa among themselves, the region was taken from Germany during World War I and divided between Great Britain and France. In 1922 the League of Nations mandated it to these powers, and it continued

under their administration until 1946 when it was put under the U.N. Trusteeship Council. In 1956 French Togoland voted for an end to the trusteeship status and for self-government within the French Union, and full independence was promised for 1960. British Togoland was administered as a part of the Gold Coast, now Ghana (*q.v.*), and in 1957 gained independence as part of Ghana. Population of Togoland, 1956, 1,088,000.

Tojo (*tō-jō*), EIKI or HIDEKI, born in Tokyo, Japan, Dec. 30, 1884; executed there, Dec. 23, 1948. Tojo was an army officer who joined the dominant pre-World War II group of militarist politicians. He became minister of war, and in October 1941 his accession to the premiership was a victory for the Japanese war party, which was largely responsible for the attack on Pearl Harbor (*q.v.*), Dec. 7, 1941. It was under the leadership of Tojo that Japan gained much of southeast Asia in the initial stages of the war. When Japanese reverses became serious as a result of Allied victories, Tojo was forced to resign in July 1944. After the Japanese surrender in 1945, he was indicted as a war criminal, convicted, and hanged. See also *Japan*.

Tokaj (*tō'koi*) or TOKAY, a town in Hungary, located on the Tisza River, 42 m. n.w. of Debrecen. The town is noted for its rich sweet wine, called Tokay wine, from the Tokay grape. Population, ca. 5,000.

Tokyo (*tō'ki-ō*) or TOKIO, the capital of Japan, located on Honshu, the main island, and facing the Bay of Tokyo (which opens out on the Pacific Ocean), on which its port is located. It is the largest city (population without suburbs) in the world. The Sumida River and many canals traverse the city.

Tokyo is the administrative, financial, and cultural and educational center of Japan. It also



Courtesy Ewing Galloway, N. Y.

BUSINESS DISTRICT OF TOKYO



Photo by R. Moulin, courtesy Ewing Galloway, N. Y.

TOKYO THEATER BUILDING

has many thriving industries and a growing tourist trade. It serves as a port for domestic trade. Modern transportation, including a subway system, facilitates communication within the city; and airlines and ships link Tokyo with other islands of Japan and with the world.

The city has adopted many ways of the West. It has a bustling business section with Western architecture; and many of the people, particularly the young, have adopted Western modes of dress. At the same time, traditions—architecture, colorful festivities and ceremonies, and clothing—of Japan's own rich culture have not been abandoned.

Among the main buildings and principal points of interest are the Imperial Palace, the diet building, the outer garden of the Meiji Shrine, and the Imperial Hotel, built by Frank Lloyd Wright (*q.v.*). The Kanda Bookstore St.—the Bohemian section of Tokyo—many landscaped gardens, Shinto shrines, and Buddhist temples are other landmarks. There are several museums (*e.g.*, Fine Arts, Patent, Science). Among the universities, the Keio, Rikkyo, Tokyo, and Waseda are most important.

Tokyo evolved from the town of Yedo (or Edo), established in the 12th century. In 1590 it became the capital of a province. In 1603 Yedo became the seat of the shogun (*q.v.*) government. Although the emperor resided in Kyoto, Yedo continued to be the principal seat of government and of social influence until the revolution of 1868 destroyed the shogun regime. At that time the name was changed to Tokyo, and the city became the residence of the emperor and capital of Japan.

Tokyo has often suffered from national disasters, one of which, an earthquake (1923) accompanied by a tidal wave and followed by fire, killed 150,000 persons and caused tremendous damage. Allied bombings during World War II, the first on April 18, 1942 (see *Air Force*), also brought destruction and loss of many lives. After the defeat of Japan in World War II, the city served as the headquarters of Gen. Douglas

TOLEDO

MacArthur (*q.v.*), supreme Allied commander. The population, which after the war was *ca.* 3,275,000, has increased to beyond what it was before the war, reaching an estimated 8,797,035 in 1958.

Tolbukhin (*tōl-bōō'hin*), FYODOR IVANOVICH, Soviet army officer, born in Darydovo, Russia, June 16, 1894; died in Moscow, Oct. 17, 1949. Tolbukhin fought in the Russian Revolution of 1917. He then studied military science and distinguished himself in the defense of Stalingrad and in other battles of World War II. He was promoted to the rank of marshal in 1944. After the war he served, for a while, as chairman of the Allied Control Commission in Bulgaria.

Toledo (*tō-lē'dō*), a city in Ohio, seat of Lucas County, on both sides of the Maumee River, 55 m. s. of Detroit, Mich. It is served by the Baltimore & Ohio, Chesapeake & Ohio, New York Central, Pennsylvania, Wabash, and other railroads, including the Terminal R.R., which encircles the city. The municipal Express Airport is 14 m. to the west. The U.S. Army maintains one of its largest depots, the Rossford Ordnance Depot, here.

DESCRIPTION: The city covers an area of 38.2 sq. m. of low, rolling or flat land ranging from 575 ft. to 625 ft. above sea level. The downtown area, on the northwest side of the Maumee, is a six-block grid whose streets are named for the first six U.S. Presidents and, in the other direction, for the Great Lakes. Within the city limits, which adjoin Michigan on the north, are two other streams, Swan Creek and the Ottawa River. The two parts of the city are joined by five bridges, one of which links Toledo with a Detroit expressway and with the Ohio Turnpike. The public buildings are grouped in a downtown civic center, near which is Lucas County courthouse. Among other outstanding buildings are the Owens-Illinois (formerly Ohio), the National Bank, Spitzer, and Security buildings, and the Libbey-Owens-Ford building, scheduled for completion in 1960. The park system covers 2,150 acres and comprises more than 50 parks, including Ottawa, Scott, and Bayview parks, and Walbridge Park, in which is the municipal zoo (founded in 1899). Among the city's hotels are the Hillcrest, the Plaza, the Commodore Perry, and the Secor.

COMMERCE AND INDUSTRY: Although it is an industrial city, Toledo depends heavily on its agricultural surroundings. Lucas County's farm value per acre of \$440 (1954) compares with a national average of \$84. Principal products are corn and wheat, soybeans, hay, truck crops, and livestock. One of Toledo's principal industries is glassmaking; it was here that Michael Owens perfected the bottlemaking machine (patented in 1895) that revolutionized packaging. In addi-

tion to bottles and tumblers, glass products include structural, window, and automobile glass and glass fibers. Other major manufactures are plastics, automotive vehicles and components, spray equipment, scales, and metal stampings. Four large oil refineries connected by pipeline with Texas and Wyoming make Toledo an important refinery center. Shipping is a major activity, of increasing importance with the completion of the St. Lawrence Seaway. In 1957, while the average shipping of 12 Great Lakes ports declined by 9.7 per cent, Toledo gained 84 per cent over 1956.

Toledo is the center of the Toledo Standard Metropolitan Statistical Area (pop., 1960, 456,931), which includes all of Lucas County. The city produced a value added by manufacture of \$495,687,000 in 1958.

EDUCATION AND CULTURAL INSTITUTIONS: Toledo's ca. 110 public and parochial elementary and secondary schools enroll ca. 63,500 pupils annually. Institutions of higher learning include the municipal Univ. of Toledo (1872), with six degree-granting colleges, the "Glass Bowl" stadium, and the Inst. of Silicate Research; and Mary Manse Coll. Among cultural facilities are the Toledo Museum of Art, which includes a school of design; the public library, with the largest main building of any library in comparable U.S. cities; the Museum of Science and Natural History; the Toledo Orchestra, and the Opera Workshop, organized in 1959.

GOVERNMENT: The city operates under the city-manager form of government, adopted in 1936. Nine councilmen are elected for two-year

terms and appoint one of themselves to be mayor.

HISTORY: Near the site of Gen. "Mad Anthony" Wayne's 1784 defeat of the Indians in the battle of Fallen Timbers, Toledo was incorporated in 1837 by combining the pioneer towns of Port Lawrence and Vistula. The area was long claimed by Michigan, but in 1836, after the almost bloodless "Toledo War," Congress settled the boundary. In the 1840's and 1850's canals were important traffic arteries in Toledo's commerce, and the Irish and German labor imported to build them became notable elements in the population, later supplemented by immigration of Poles and Hungarians. In the 1860's the canals were superseded by the railroads. Early in the 20th century, Toledo gained a reputation as a city wide open for crime, and there ensued a series of reform movements culminating in adoption of the city-manager system in 1936. Toledo was hard hit by the depression of the 1930's. During this period serious labor troubles led to the formation of the Labor-Management-Citizens Committee, the success of which in settling labor disputes aroused nationwide attention. In 1946 Toledo was one of the first cities to adopt a municipal payroll income tax, of one per cent, the revenue from which paid off the city debt and provides funds to supplement the comparatively low real-estate tax.

POPULATION: Toledo's population was 81,434 in 1890; its decade of greatest growth was 1910-20, which showed an increase from 168,497 to 243,164. In 1950 the population was 303,616; in 1960, 318,003.

Toledo, a city of Spain, in a province of the same name (area, 5,919 sq. m.; pop., 1956, 517,100), on the Tagus River, ca. 40 m. s.w. of Madrid. It is the see of the primate of Spain and has been significant in Church history since the earliest times of Christianity. Several important church conferences were held here. Landmarks include a 13th-century Gothic cathedral, ancient city walls, a Moorish bridge, a 13th-century synagogue (now the Church of Santa Maria La Blanca), a Roman aqueduct, and, rising from the city's highest point, the remains of the Alcázar, a magnificent 16th-century fortress and palace. As recently as 1936, the Alcázar was the scene of a 70-day siege during the Spanish Civil War. Because of its location on a promontory in mountainous country, surrounded on three sides by the Tagus River, the city was a natural military stronghold during ancient and medieval times. During modern times the city has diminished in importance, except ecclesiastically.

Toledo has been famous for centuries for its production of fine swords, which are still made,

AIR VIEW OF TOLEDO, OHIO

Courtesy Toledo Chamber of Commerce, Ohio





Courtesy Metropolitan Museum of Art, N. Y.

VIEW OF TOLEDO, SPAIN

Painting by El Greco (1547-1614)

leather, paper, guitar strings, utensils, chemicals, and clothing. Toledo is a very ancient city and is intimately connected with the history of Spain. The Romans under Marius Pluvius captured it in 192 B.C., when it was important as a strategic and commercial point, and it was taken by the Moors in 714 A.D. Castile annexed it in 1087 and it became the capital of Castile. It began to decline after the royal residence was moved to Madrid in 1559. Population, ca. 35,000.

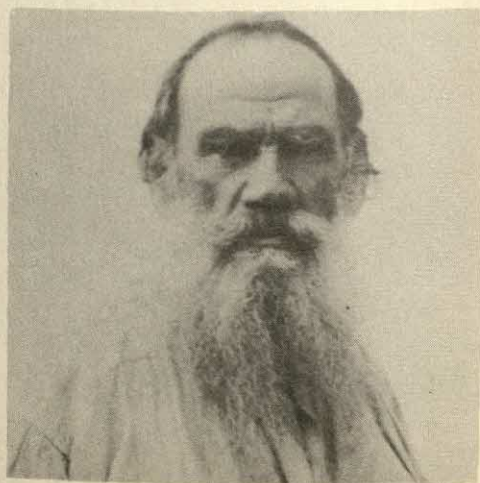
Toleration Act (*tól-ér-ä shün äkt*), term designating specific laws granting religious tolerance to nonconformists. Among the better-known Toleration Acts are included the Rhode Island law of 1649, passed by Roger Williams to insure equality of status for all Christians. An English law of 1689 gave similar rights to Protestant nonconformists. In a broader sense the extension of religious privilege such as Catholic emancipation in Britain (1829) may be considered within the meaning of the term.

Tolstoy (*tól'stoi*), ALEKSEI NIKOLAEVICH, author, born Dec. 29, 1882, in Nikolaevski-Samarskom, Samara, Russia; died in 1945. Considered one of Russia's greatest modern writers, he was related to two great Russian novelists, Leo Tolstoy on his father's side and Ivan Turgenev on his mother's. He was educated at the St. Petersburg Technological Inst. and before World War I had published two volumes, a collection of short stories entitled "Magpie Tales" (1909) and a novel, "The Left Bank of the Volga" (1910). During that war he served as a newspaper correspondent and after the war fought in the revolution on the side of the Whites. He left the country after the Red victory,

TOLSTOY

but returned in 1922, and, by 1937, had been elected deputy from Leningrad province to the Supreme Soviet. Tolstoy, who was one of the most popular and respected of Russian writers, wrote "The Lame Esquire" (1914), "Odd People" (1915), "Nikita's Childhood" (1922), "Aelita" (1923), "The Death Box" (1925), "The Adventures of Nevzorov: or Ibcus" (1925), "Bread" (1937), and other novels. His plays include "Rasputin" and his other works a fictionalized biography, "Peter the Great" (1930).

Tolstoy (*tól'stoi*), OR TOLSTOI, LEO (LYEV) NIKOLAYEVICH, COUNT, Russian novelist and moral philosopher, born in Yasnia Poliana, Russia, Aug. 28 (Sept. 9), 1828. His family was descended from Count Peter Tolstoy, an associate of Peter the Great. After studying at the Univ. of Kazan, he entered the Russian army in 1851 as an officer of engineers, serving throughout the Crimean War, and subsequently published "Sebastopol." He resigned from the army in 1856 to devote himself to writing, publishing his first noted novel in 1860. This work, "War and Peace," is one of the greatest of all historical novels and describes in the most grandiose way Russian life at the time of the invasion of Russia by Napoleon in 1812. In his highly popular novel, "Anna Karéniná" (1876), he depicted Russian society of the '70's. From then on he devoted himself largely to a study of modern social life and religious and moral philosophy. His religious life was that of a Christian socialist, placing himself on a plane with the common people and sharing with them his life and income. In the famine of 1891-92 he made large donations to relieve the suffering and was appointed agent for those contributing aid from foreign countries. His sincere Christian endeavors



Courtesy Gramstorff Bros., Malden, Mass.

LEO N. TOLSTOY

brought him continuously in conflict with his wife, who had no understanding for the consistency with which he tried to regulate his life according to the doctrines in which he believed. This perpetual tragedy ended in his flight from home immediately before his death. He died alone, away from his estate, on Oct. 28 (Nov. 20), 1910.

The writings of Tolstoy touch a number of fields, on government, social development, religion, and political economy. Among the most important are "The Kreutzer Sonata," "The Kingdom of God Is Within You," "My Religion," "Patriotism and Christianity," "My Confession," "Two Pilgrims," "What to Do," and "The Resurrection." The latter work was published in 1899 and is a treatise on the period of Russian history included between the ascension of Alexander III and the year 1899. At the time of the Russo-Japanese War he issued several books and tracts that were unfavorable to the government, in which he advocated greater consideration for the interests of the peasants and the middle classes. Most of his plays belong to his later period, "The Power of Darkness" and "The Living Corpse" being the best known and most frequently performed on European stages. Tolstoy exercised remarkable influence as a writer on social and political questions both in Russia and other countries. Many of his works have been translated into European and Asiatic languages.

Toltec (*tōl'tēk*), or **TOLTECA**, the name of a native race in Mexico, which occupied a large part of that country before the arrival of the Aztecs. They had their capital at Tula, north of the valley of Mexico, where the Spaniards found extensive ruins at the time of the Spanish conquest. It is evident that these people were well advanced in agriculture and many of the mechanic arts. They were workers of clays and metals and invented a system of time which was later adopted by the Aztecs. They were the founders of the civilization which prevailed in ancient Mexico. It appears that they migrated from the north in the 7th century A.D. and expelled a savage race from Anahuac and that they themselves were driven out of the country by the Aztecs when that conquering tribe came from the north.

Toltec Gorge (*tōl'tēk gōrj*), a scenic canyon of the Rocky Mts., in Colorado, on the Denver & Rio Grande R.R. The railway line passes through a tunnel in the mountain forming the walls of the gorge, and as the train passes near the brink of the mountain side, fully 1,250 ft. above the bottom of the canyon, passengers get a superb view of the walls of the gorge and the foaming water that dashes in torrents below. Few places in the Rocky Mts. present

more beautiful and remarkable natural scenery. To the grandeur of the natural scene are added the remarkable extent of strestle work and engineering skill in constructing the railway through the rocks and along the edge of the precipice.

Toluca (*tō-lō'ká*), a city of Mexico, capital of the state of Mexico, 35 m. s.w. of the City of Mexico. It is situated on a lofty plateau, on the line of the Mexican National R.R., and has a cool and healthful climate. The streets are clean and well improved. It has manufactures of flour, cotton and woolen goods, clothing, and earthenware. Toluca is thought to have been founded by the Toltecs and it was occupied by the Aztecs at the time of the conquest. Population, ca. 42,500.

Tomahawk (*tōm'á-hák*), originally a war club used by the Indians in North America; the name was later extended to include the war hatchet. The Indians made these hatchets of stone, usually granite. They cut a depression or furrow on opposite sides, so as to permit fastening a wooden handle by means of sinews or cords of skin. Later, hatchets of steel, furnished by European traders, took the place of the primitive kind. The Indians developed much skill in the use of the tomahawk, which was either used in hand-to-hand combat or thrown with great force, when it was directed so the edge would strike first. To bury the hatchet signifies peace, while to dig up the hatchet is equivalent to a declaration of war.

Tomato (*tō-mā'tō*), a plant of the nightshade family, extensively cultivated for its edible fruit. The tomato is native to South America, whence it was introduced to the U.S. about 1830. It is a weak-stemmed trailing annual with jagged leaves, resembling the potato in its general appearance, and bears small flowers of a yellowish color. Many species have been evolved by propagation, bearing fruit ranging in size from a small plum to that of a large apple. The fruit is shaped more or less irregularly and is usually of a red or yellow color. The seed is sown early in March and the young plants are transplanted to the garden as soon as all danger of frost is past, though this mode of treatment applies only in the Temperate Zones. It is best to fasten the plants to a wall or other support where the sun may strike them with full effect, thus keeping the vines off the ground and hastening the ripening of the fruit. Tomatoes do not ripen much farther north than 45°. The fruit is used for a condiment before fully ripened, and the ripened product is eaten raw. However, its greatest value is in preparing sauces, preserves, and pies. Large quantities of tomatoes are canned and sold in the market at all seasons of the year. Maryland, New Jersey, Indiana, California, and Florida take the lead in the cultivation of this plant.

Tomb (*tōm*), a structure for the burial of the

dead, either within the ground or upon the surface. In some ancient civilizations it was customary to construct tombs of great strength, and the dead were embalmed with the view of preserving the bodies until they would take on immortality. In many countries, as in Egypt, the highest efforts of art were bestowed upon the burial places. Remains of these in the form of pyramids (*q.v.*), or mastabas, are very extensive, some in a high state of preservation, and innumerable mummies, dating back to the early kings of Egypt, have been preserved. The catacombs of Rome, in which were preserved either the urns with the cremated remains of the dead or sarcophagi containing the corpses themselves, are among the remarkable tombs of antiquity. Greek tombs were also famous for their rich architectural and sculptural decorations; especially well known is the mausoleum of King Mausolus of Caria, from which the name mausoleum (*q.v.*) originated; this tomb is considered one of the seven wonders of the ancient world. Quite different are the monuments of the countries farther east—for instance, the Taj Mahal (*q.v.*).

During the Middle Ages it became customary to place tombs either at the walls or on the floors of churches. Originally they were set on the floor of the church, but later tombs were constructed under the floor, and stones with inscriptions were placed so as to make a part of the floor. Many of these tombs placed at the wall, erected in the Middle Ages and during the Renaissance, became works of art, executed by the best architects and sculptors of their times—for instance, the tomb of Pope Julius II by Michelangelo (*q.v.*) in the Roman Church of St. Pietro in Vincoli, or the tombs of members of the Medici family in Florence, also by Michelangelo.

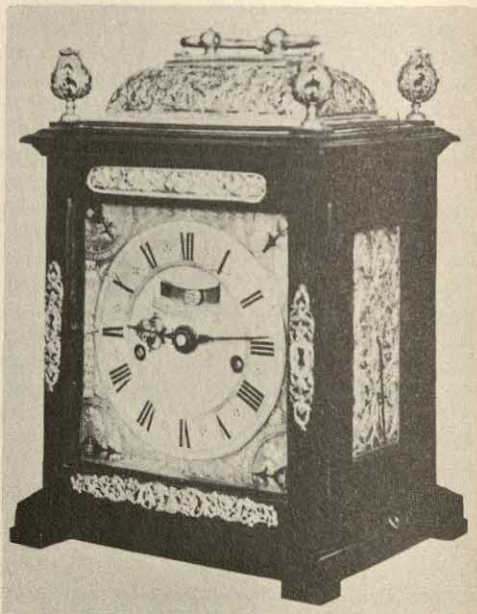
Tombigbee (*tôm-big'bee*), a river which rises in northeastern Mississippi and flows south-south-east into western Alabama, then south to join the Alabama and form the Mobile River about 45 m. N. of Mobile. The Tombigbee is 409 m. long and is navigable for about 350 m. (from its confluence with the Alabama to Columbus, Miss.).

Tombouctou (*tôn-boôk-tôo'*) or TIMBUKTU, a city of French West Africa, situated near the southern border of the Sahara Desert, in the territory of the French Sudan, ca. 10 m. N. of the great bend of the Niger River. It is the center of caravan routes from Morocco, the Guinea Coast, and the Inner Sahara and is also on the motor transport route across the desert. Tombouctou has considerable trade in gold, gum, salt, and ivory. Settled in the late 11th century, it became a flourishing trade center for Negro tribes and a seat of Moslem culture. In 1591 its commercial prosperity was ruined by a Moroccan army; it was sacked frequently in the 19th century and was little more than a vast heap of ruins when

the French took possession in 1893. Population, 1949 (est.), 7,000.

Tommy Gun (*tôm'ti gûn*). See *Machine Gun*.

Tompion (*tôm'pi-ûn*), THOMAS, clockmaker, called the "father of English watchmaking," born at Northhill, Bedfordshire, England, ca. 1639; died in London, Nov. 20, 1713. With its inventor, Robert Hooke, he made (1675) one of the first English watches with a balance spring. When the Royal Observatory was established, Tompion became (1676) its clockmaker. His clocks were famous for their durability, accuracy, and craftsmanship. He is buried in Westminster Abbey.



Courtesy British Information Services, N. Y.

TOMPION CLOCK, ABOUT 1705

Tompkins (*tôm'kînz*), DANIEL D., Vice President of the U.S., born in Scarsdale, N.Y., June 21, 1774; died in Staten Island, N.Y., June 11, 1825. A graduate (1795) of Columbia Coll., he was admitted to the bar in 1797. He was associate justice of the New York supreme court (1804-07) and governor of the state (1807-17). A supporter of the economic policies of Thomas Jefferson, in 1812 Tompkins prorogued the New York legislature for ten months in a vain attempt to prevent the establishment of the Bank of North America in New York City. In 1817 he recommended the abolition of slavery in New York. He was elected Vice President under James Monroe in 1816 and was re-elected in 1820.

Tom Sawyer (*tôm sâ'yēr*), the chief character in a novel of the same name, published (1875) by Samuel L. Clemens (*q.v.*) under his pen-name of Mark Twain. The adventures of Tom

Sawyer, a rural Western youth, typified for succeeding generations the spirit of the American boy.

Tomsk (*tômsk*), a city of Siberia, on the Tom River, a tributary of the Obi, about midway between the boundary of Europe and Lake Baikal. It is reached by the Trans-Siberian R.R., with which it is connected by a short branch line. The manufactures include soap, liquors, leather, hardware, lumber products, clothing, and implements. It has an extensive trade with the Mongols and Kalmucks in the region lying south of Siberia. There are a number of excellent government buildings, numerous churches, and a university. Extensive mines of gold, silver, copper, zinc, lead, iron, and coal are in the vicinity. It produces large quantities of wheat and other cereals. Cattle, horses, and sheep are raised extensively. Tomsk was founded in 1610, but its prosperity dates from 1824, when gold was found in the district. Under the Soviet Five-Year Plans, begun in 1928, the city has gradually become an important industrial and educational center. Population, *ca.* 142,000.

Tom-Tom (*tôm'tôm*), or TAM-TAM, a musical instrument used by many Asiatics, chiefly in China and India. It is in the form of a metal disk, is concave in the central part, and is suspended from the neck by a loop. The player strikes the instrument with the fingers or a set of sticks that have a soft knob. The tom-tom is used to produce tones for dancers and in some cases to attract attention.

Ton (*tûn*), a measure of weight used in Great Britain and the U.S. It is equivalent to 20 standard hundredweights of 112 pounds each, or 2,240 pounds. This is the *long ton*, while the *short ton* in common use contains 2,000 pounds. The hundredweight in the latter contains 100 pounds. Unless otherwise specified, it is understood that a ton consists of 2,240 pounds avoirdupois. The liquid ton, or tun, contains 252 gallons.

Tonawanda (*tôn-à-wôn'dà*), a city in Erie County, New York, on the Niagara River and the New York State Barge Canal, 10 m. N. of Buffalo. Chief manufactured products are office equipment, fiber products, chains, paper boxboards, steel products, abrasives, and lumber products. Tonawanda is now practically united with North Tonawanda (*q.v.*), which is situated in Niagara County. Settled in 1808, Tonawanda was incorporated in 1903. Population, 1950, 14,617.

Tone (*tôn*), in music, the sound produced by a sonorous body, as a string or a piece of metal. The term is specially applied to the larger intervals of the diatonic scale, while the smaller intervals are known as *semitones*. Tones are classified according to the qualities and relations of the sound, depending upon their place on the scale, as high or low tones, or as fine, clear, or

feeble tones. Some writers use the words *step* and *halfstep* instead of *whole tone* and *semitone*.

Tonga (*tông'gá*), or FRIENDLY ISLANDS, an island group in the South Pacific Ocean, about 250 m. S.E. of the Fiji Islands. The islands, about 150 in number, are divided into three groups by two narrow channels and have a total area of 390 sq. m. Tongatabu, with an area of 125 sq. m., is the largest and contains Nukualofa, the capital. About 30 of the islands are inhabited by friendly natives. The islands are partly of volcanic and partly of coral origin and have a fertile soil. A number of the volcanoes are active, including Tofoa, height 2,785 ft., and Late, height 1,790 ft. Copra, sponges, coffee, wool, and tropical fruits are the chief products. Handicrafts include rude machinery, pottery, and wearing apparel used by the natives. Christian missionaries began active work in 1877, since which time schools have been established. The government is directed by a native Christian chief and is administered under a constitution, which provides for a representative parliament and a well-established judiciary. European customs, education, machinery, and utensils have been introduced to a large extent. The island group was discovered in 1643 by Tasman. It was visited in 1777 by Capt. Cook, who applied the present name. The islands were declared neutral by the Declaration of Berlin in 1886, but Germany, Great Britain, and the U.S. held special treaties. In 1899, with the consent of Germany and the U.S., Great Britain proclaimed Tonga a protectorate. Population, *ca.* 35,000.

Tongue (*tûng*), an organ situated in the mouth of nearly all vertebrates, though most completely developed in mammals. In man the tongue is a highly muscular organ, covered with mucous membrane, and the sides, upper surface, and front part are free to move under nerve stimuli. Hence, it is highly useful in mastication, deglutition, and the articulation of speech. The mucous membrane is covered by peculiarly developed papillae, or eminences, which constitute the chief seat of the sense of taste; these are known as *taste buds*. It has three kinds of papillae—the filiform, the fungiform, and the circumvallate. The *conical filiform papillae* are minute structures on the upper surface; the *fungiform papillae* are somewhat larger than the filiform and are scattered irregularly; and the *circumvallate papillae* are near the posterior part, forming 8 to 10 of the largest structures of this kind, and are somewhat V-shaped. A slight furrow, called the *raphe*, characterizes the tongue along the middle, extending nearly its whole length, and often terminates by a depression behind called the *foramen caecum*, into which mucous glands open.

A restraining band or fold, called the *frenum*, abridges the backward movement of the tongue.

tip. A person in whom it extends quite to the tip is prevented more or less from the free use of the tongue in articulating speech and chewing. This is a congenital condition, and those suffering from it are said to be *tongue-tied*. The tongue in the lower mammals is essentially the same as that in man. As a rule birds have a small, cartilaginous tongue, which serves in most species rather for prehension than taste, although some birds, such as parrots, have a soft and fleshy tongue which gives them some ability to imitate the human voice. The horny tongue found in some birds is a prolongation of the hyoid bone. Most lizards have a long, protrusile tongue, usually forked, although in some species it is fleshy and not protrusile. In fish, the tongue is rather an organ of prehension than of taste, and in some species is covered with toothlike projections. The name tongue is applied loosely to very different structures in invertebrate animals. See *Taste*.

Tonic (*tôn'ik*), a medicine used to promote nutrition or increase the strength of organic action. It is intended to induce greater energy in all parts of the body, without necessarily causing any apparent or unusual increase in the healthy action of particular organs. Tonics are usually divided into two classes, those that influence the stomach so as to increase its digestive functions and those that pass directly into the blood and act as stimuli. Among the former are the bitters, such as gentian, boneset, quassia, and camomile. Various preparations of salts and iron have a favorable influence upon digestion and exert an influence upon the blood. Such activities as bathing and exercise are often referred to as tonics, although they are nonmedical in character.

Tonka Bean (*tôn'ka bân*) or TONKA BEAN, a tree, native to Guiana, which often grows to a height of 60 to 80 ft. It has pinnate leaves, a purplish flower, and bears a shiny, black-skinned fruit that resembles an almond. The single seed contained in the fruit is known commercially as the tonka bean. The bean has a pleasant odor somewhat similar to new-mown hay, and is frequently used in the manufacture of perfume, seasoning, and spice; as a substitute for vanilla; and for scenting clothing and special brands of tobacco. The wood of the tonka-bean tree is hard, heavy, and close-grained, and is considered valuable for cabinet work.

Tonkin (*tôn'kin'*) or TONGKING, known since the end of World War II as NORTH VIET NAM, one of the former federated states of Indo-China that now comprise Viet Nam. Situated in southeastern Asia, it is bounded on the n. by China, on the e. by China and the Gulf of Tonkin, on the s. by Annam (Central Viet Nam), and on the w. by Laos. It has an area of 44,660 sq. m. The eastern part of the country is level and alluvial; the northern and western sections comprise

heavily timbered mountain regions. The Red (Songkoi) River crosses the country from the north and forms a rich delta that produces rice, sugar, cotton, jute, and tobacco. The principal minerals produced are tin, iron, and coal. The population, primarily Annamese, was 9,931,193 in 1943; Buddhism is the predominant religion. The chief cities are Hanoi and Haiphong.

Formerly a part of China, Tonkin achieved independence in 931 and remained self-governing until 1801 when it was united with the neighboring country of Annam. In 1885 it became a part of the French network of protectorates in Indo-China and retained that status until the Japanese occupation of the area in World War II. After the war Tonkin joined with Annam to form Viet Nam, an independent state within the French Union. See *Viet Nam*.

Tonnage (*tôn'ij*), the unit on which the assessment of dues and charges on shipping is based. The carrying capacity, or weight expressed in tons, is termed the tonnage of a ship. For each 100 cu. ft. of internal measurement, it is reckoned that a vessel may carry a ton. This unit is sometimes used in buying and selling vessels. *Gross tonnage* is the entire space within the ship, while *net tonnage* is the actual space that may be used in carrying cargo or passengers. The term *displacement tonnage* signifies the weight of sea water displaced by the ship, and *dead-weight tonnage* signifies the actual capacity of cargo that the vessel can safely carry.

Tonsillitis (*tôn'sil-l'itis*), in medicine, an acute or chronic inflammation of the tonsils (*q.v.*) resulting usually from infection by the hemolytic streptococcus, of which there are many types of varying degrees of virulence. The tonsillitis may be primary (inflammation confined to the tonsils themselves) or a part of a general infection of the upper respiratory tract including the nose, pharynx, sinuses, trachea, and bronchi. Young people are particularly susceptible, and most cases occur during the cold and damp seasons.

Acute tonsillitis usually begins with malaise, headache, chilly sensations, loss of appetite, and variable fever according to the virulence of the infection. Swallowing is painful, the neck may be tender, and the lymph nodes of the neck may be enlarged and sore to touch. The tonsils are swollen and red, and frequently their crypts are filled with yellowish plugs of pus. The condition lasts for a few days and then slowly subsides. In severe forms, often called septic sore throat, there may be severe prostration, high fever, and a stormy course, with occasional complications of acute glomerular nephritis (kidney infection), quinsy (*q.v.*), otitis media (ear infection), or erysipelas (streptococcal infection of the face). Treatment includes rest, fluids, nourish-

ing food, ice packs to the throat, analgesic medication, warm saline gargles, and sulfadiazine or penicillin in severe cases. After recovery, tonsillectomy (surgical removal of the tonsils) is advisable, since recurrences of tonsillitis are common.

Chronic tonsillitis is a mild infection in the tonsils, with or without enlargement thereof, which may last for years, with occasional episodes or flare-ups of acute symptoms. In such cases the tonsils may be the focus of infection for other diseases such as nephritis, rheumatic fever, or neuritis.

Tonsils (*tŏn'sīlz*), in anatomy, the name applied to the two small almond-shaped bodies of lymphoid tissue (see *lymphatic system*). The tonsils are situated one on either side of the upper part of the throat between the anterior and posterior pillars of the soft palate (*q.v.*). They consist of aggregations of 12 to 15 lymph follicles and are covered by mucous membranes which dip into small depressions of the tonsils called crypts. These tonsils are also called the *faucial tonsils*, or the *palatine tonsils*. The *lingual tonsil* is an accumulation of lymph-adenoid tissue at the base of the tongue. The *pharyngeal tonsils* are small masses of lymph-adenoid tissue in the pharynx between the openings of the eustachian tubes (small openings connecting the middle ear with the throat). All these tonsils as a group form a ring of lymphoid tissue about the throat known as Waldeyer's ring. The tonsils are thought to function as protectors of the throat and surrounding tissues from infection, but inasmuch as the tonsils themselves are subject to frequent and annoying infections, removal is often necessary. See *Tonsillitis*.

Tonsure (*tŏn'shēr*), the practice of shaving a portion of the hair from the head of a priest, as a mark of distinction between the clergy and the laity. It was not in vogue before the 5th century, but at that time the monks began to clip the hair in small places or to shave the entire head. This was done partly to show their contempt of the world. In the 6th century the clergy began to practice tonsuring. In 721, it was made obligatory on all priests by Pope Gregory II to use the so-called *tonsure of Peter*, which consists of shaving the entire head and leaving a circular crown of hair. The practice of shaving the front part of the head from ear to ear, known as the *tonsure of James*, was practiced in Ireland for many years. Priests, bishops, and cardinals of the Roman and Greek Catholic Churches still practice this religious observance.

Tonty (*tŏn'tè*), HENRY, explorer, born at Gaeta, Italy, about 1650; died in 1704. He entered the military service of France at an early age and accompanied La Salle to Quebec in 1678. He built a vessel and explored the eastern shore

of Lake Michigan, the Illinois River, and Green Bay. In 1680, he built a fort near Peoria, Ill., and twice descended the Mississippi. He resided among the Illinois Indians until 1702, when he joined Iberville in Louisiana. His death occurred at Ft. St. Louis, now Mobile.

Tools (*tŏlz*), implements or instruments used to aid in the performance of mechanical work. Tools are characterized by being movable and by manual operation, as opposed to power-driven machinery or apparatus. Tools include many objects called by different names according to the field of work in which they are used.

The ability to use tools is instinctive with man as contrasted to animals, though some of the higher apes use objects as throwing-pieces or reach for inaccessible things with sticks. Primitive man used clubs, developed bone tools, stone implements, and hand-axes, which he later improved by the addition of handles. During 100,000 years there was but slow advance in the kinds of tools which man used. However, this rude development was accelerated rapidly beginning about 3000 B.C. when the Copper Age began, and when the wheel was invented. This period was followed rapidly by the Bronze Age, the Iron Age, and the modern evolution of steel, the latter accompanied by the most rapid increase in mechanical inventiveness which mankind has ever known and which led ultimately to the mass production method of present day industry.

When some of man's earliest tools are listed, the development of some of the common modern tools becomes obvious. The adaptation of these tools to many different arts and industries accounts for the thousands of tools used today. For example, from the stone ax may be traced the hatchet, the adz, the modern axes. From the hand stone and its mate the anvil come the hammer, the pile driver, the air-driven (pneumatic) hammer, the electrically driven hammer, the modern anvil. From the bone scraper, the scraping tools, the grindstone, the whetstone, the file, the chisel. From the throwing-stone, the harpoon, the lance, the slingshot, the catapult, the bow and arrow, the gun, and the bomb. From the digging stick, the plow, the shovel, the rake, the hoe, the pitchfork. From the primitive bone needle, the sewing needles, the awl, the nail, the gimlet, the punch. From the primitive rubbing stick for fire making, the fire bow-and-drill, the modern match, the forge and bellows, the auger and bit, the pneumatic and electric drills, the diamond drill. From the principle of the lever, the crowbar, the inclined plane, pliers, scissors, clippers, the electric razor, the vise, the various kinds of wrenches, and the pneumatic jack. From the principle of the wheel, the wheelbarrow, the ratchet, the pulley, and the crank. From primitive charcoal crayons, brushes, pencils, pens, the type-

writer, and artists' implements. From simple mathematical concepts, the plumb, the level, the square, circles and angles as used in navigation and other instruments. From the primitive bone spoon, eating implements. From the primitive bone comb, modern combs, textile carding instruments. From the bone knife, the stone knife, the metal knife, the draw knife, the scythe, the saw, the sword, the dagger, and the mowing machine. This list could, of course, be extended almost indefinitely. See also *Pre-History*.

Toombs (*tōōms*), ROBERT, politician, born in Wilkes County, Georgia, July 2, 1810; died in Washington, Ga., Dec. 15, 1885. He was graduated from Union Coll., New York, in 1828, and later became a lawyer. He was elected to the state legislature in 1837 and to the U.S. House of Representatives as a Whig in 1845. In Congress he favored the slavery compromise of 1850. In 1853 he was elected to the Senate, but he withdrew in 1861 to join the Confederacy. He served as a member of the Confederate Congress, and after a brief period as Secretary of State, he became a brigadier general in the Confederate army, taking part in the Peninsular campaign, the second Battle of Bull Run, and Antietam. In 1865 he fled to Europe to escape arrest; returning two years later, Toombs resumed the practice of law in Georgia, but he never sought to win pardon by taking the oath of allegiance to the U.S.

Topaz (*tō'pāz*), a mineral which has a high rank among the gems. It has a vitreous luster and is either transparent or translucent. The color ranges usually from white to yellow, but there are sometimes light shades of green, blue or red. Pure topaz has a specific gravity of 3.498, and its hardness is greater than that of quartz. It is composed of silicate of aluminum, with a little oxide of iron, and a quantity of fluorine acid. Topaz is found in many parts of the world, generally in primitive rocks. Fine specimens are obtained in Brazil, Ceylon, Siberia, Scotland, Germany, and in Cornwall, England. Brazilian topaz is considered the most valuable and, when cut in facets, it closely approaches the brilliancy and luster of the diamond. False topaz is a variety of yellow quartz.

Topectomy (*tō-pēk'tō-mē*), in medicine, a surgical procedure in which a small area of the brain is removed in order to relieve severe mental disorder. See also *Psychiatry*.

Topeka (*tō-pē'kā*), capital of Kansas and seat of Shawnee County, in the northeastern part of the state, on the Kansas River, 55 m. w. of Kansas City. It is served by the Atchison, Topeka & Santa Fe, the Union Pacific, the Chicago, Rock Island & Pacific, and the Missouri Pacific R.R.'s. The municipal airport adjoins the city on the north-east; to the south are two military installations,

Forbes Air Force Base and Topeka Air Force Station.

The city lies on both sides of the river, on rolling land. Its extensive park system includes Gage Park, site of the Reinisch Rose and Rock Garden. The state capitol is famous for a series of murals by John Steuart Curry. The city is the seat of Grace Cathedral (Protestant Episcopal) and of the Washburn Univ. of Topeka. Cultural facilities include the Kansas State Historical Society museum and library, the Mulvane Art Museum, and the state library. As the seat of the Menninger Foundation, the Winter Veterans Admin. Hospital, and the Topeka State Hospital for the mentally ill, the city is a leading center of psychiatric treatment and training.

An important industrial and marketing center, Topeka is the site of the general offices and the repair shops of the Santa Fe R.R. Other major industries are printing and publishing, insurance, flour-milling, food-processing, and dairying. Among manufactures are rubber and foundry products, tents and awnings, medicines, and clothing. The surrounding area produces grain, fruits, vegetables, and livestock. The city is the center of the Topeka Standard Metropolitan Statistical Area (1960 pop., 141,286), which includes all of Shawnee County, with a value added by manufacture (1958) of \$74,488,000.

Topeka was laid out in 1854 on the Oregon Trail by free-state advocates from Laurence, Kans., and New England; following the passage of the Kansas-Nebraska Bill, it became the center of antislavery partisans. The Free State constitution was signed in Topeka in 1855. Incorporated in 1857, it became the capital in 1861 when Kansas was admitted to the Union.

In 1900 Topeka had a population of 33,608; in 1940, 67,833. Its decade of greatest growth was from 1950, when the population was 78,791, to 1960, when it reached 119,484.

Tophet (*tō'fēt*), in the Old Testament, a place south of Jerusalem, in the valley of Hinnom (2 Kings 23:10; Jeremiah 7:31). Here the Jews in earlier times offered their children to Moloch (*q.v.*). Hence the name has been applied to any place of abomination such as the gate to hell.

Toplady (*tōp'lā-dī*), AUGUSTUS MONTAGUE, clergyman and writer of sacred poems, born at Farnham, Surrey, England, Nov. 4, 1740; died Aug. 14, 1778. He was educated at the Westminster school and at Trinity Coll., Dublin, Ireland, receiving the B.A. degree in 1760. In 1764, he was ordained priest and given the curacy of Farleigh, Hungerford. He also held charges at Harpford, Venn-Ottery, and Broad Hembury. During the last years of his life he preached at the French Calvinistic Chapel in London. Toplady was a staunch supporter of Calvinism in the Church. His vehement controversy with

TOPOGRAPHY

Wesley, against Methodism, was precipitated by his translation (1769) of a Latin tract on Calvinism by Jerom Zanchius. Toplady and Wesley carried on a heated correspondence, some of which was published in the *Gospel Magazine*, which Toplady edited for a year or two. Toplady wrote several books on religious subjects, the best known of which was "The Historic Proof of the Doctrinal Calvinism of the Church of England" (1774). He also is the author of a number of hymns, among them, "Rock of Ages, Cleft for Me" (1775).

Topography (*tô-pŏg'rá-fŷ*), a term now commonly signifying the relief features in the landscape. A good topographic map will show just where the hills, mountains, valleys, and lowland plains are located. A skillful surveyor and map maker will use some method or device by which he can show all the different forms of the land. Some use artistic shading made with an air brush, others use the art of sketching. Government surveyors use contour lines, for they are mathematically accurate (see *Contour Map*).

A *contour line* is one which connects points which are at the same elevation above sea level. Thus the first 10, 20, 50, or 100 ft. contour line above sea level connects points that are 10, 20, 50, or 100 ft. above sea level. If contour lines, drawn at 100-ft. intervals, are near together on the map it is easy to appreciate that the slope is steep for the change in elevation is rapid. Where the contour lines are far apart and one must travel a long distance to rise 100 ft., the slope of the land surface is gentle. Therefore, the spreading of the contour lines indicates a level or nearly level country. If a map engineer wishes to show a depression like a sinkhole or a great volcanic crater he uses depression contours for that purpose. These lines have little hachures on the inside or pointing into the low place. There is no land form that cannot be shown with these lines, but any one who wishes to use such maps must learn how to read them.

All members of the army and navy should be experts in map reading. Any one who has to guide the movement of troops over a landscape should be able to determine with a good topographic map where the best route of travel is located, where he can keep his troops unseen by enemy outposts, and where he can keep his troops out of gun range from certain batteries. Every naval officer should know how to read coast charts so that he can have an accurate mental picture of the topography of the sea bottom near the shore and of the forms of land where he may plan for an invasion. Officers in charge of submarine vessels must be expert map readers. They are particularly interested in the topography of the sea bottom in shallow waters.

The best topographic maps are commonly made



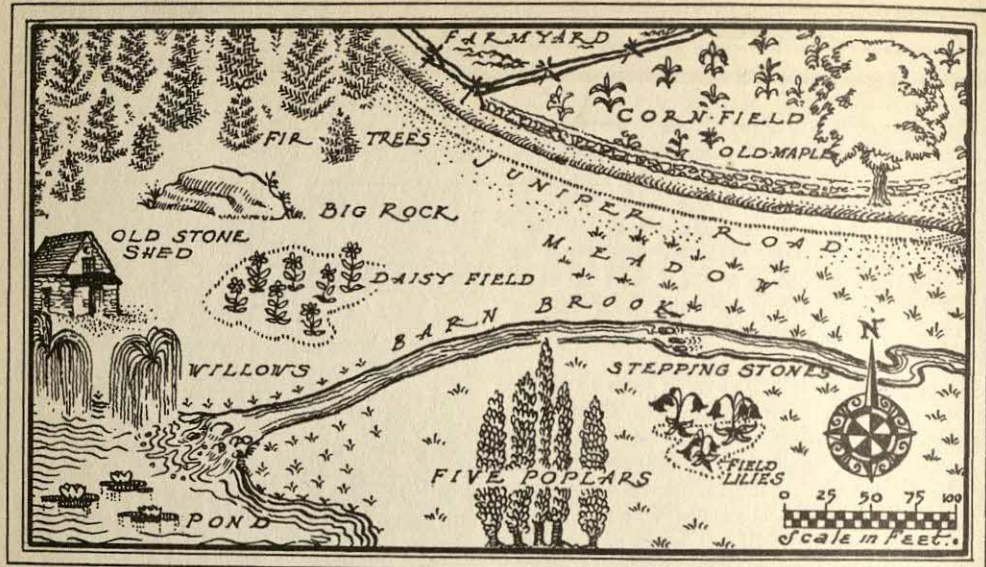
Courtesy U. S. Army Map Service

TOPOGRAPHERS AT WORK

by government surveyors. Such maps include not only the relief features, which are commonly shown with brown contour lines, but all water bodies, which are shown with blue ink. They show also "cultural features" such as roads, houses, cities, towns, and railroads. These are usually shown in black. Recently our best topographic maps have shown the chief automobile highways in red and some have shown the distribution of forested areas in green.

Airplane pilots must also become experts in map reading. They should know their location every minute while they are in the air and they commonly do that by recognizing the topographic or other features in the landscape below them and finding these same features on the map which they carry in their cabin. When there are fogs or clouds modern airplanes receive pictures of the landscape by radar (*q.v.*).

Some people enjoy map making as a hobby, and will make a map of their own city or town or farm. Some indicate by colors what is grown in each field on their farm. Others become interested in making maps to show distributions of plant life, and indicate with different colors where the forests and grasslands are located and where there are desert areas. Some enjoy making maps to show the distribution of people on the earth or the belts where corn, wheat, and oats are grown. There are so many kinds of maps made now that the profession of map making or becoming a cartographer is attracting more and more students.



MAP MAKING AS A HOBBY

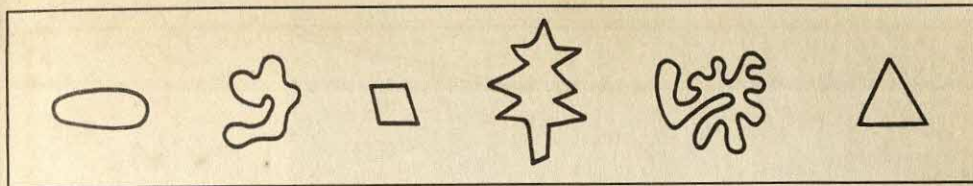
All that is necessary to draw a map similar to the one reproduced above is a keen eye, some paper, a sharp pencil, a ruler and some waterproof India ink. Measure the dimensions of your subject, and then reproduce them in scale; thus 10 feet might equal 1 inch, or in the case of a larger project even 100 feet might equal 1 inch. Do all your preliminary work in pencil, drawing as light and fine a line as possible. (With a little practice you should be able to draw a line measuring $1/100$ of an inch.) Indicate on your scale map the location of all objects; thus if a chair is three feet from a wall, it should be proportionately as far from the wall on your map. All possible objects should be located on the map in pencil, with the finished job being re-done in India ink. Avoid lettering as much as possible, as it takes too much space; in its place use colored inks or water-colors. In time you will find it handy to use special instruments such as a plane table, a spirit level, an open sight rule, and a prismatic compass. The plane table, which is set on a tripod, will enable you to take your work anywhere, setting up the table as you work and making better sketches "on location." The spirit level insures that the table is level. The open sight rule provides a view in exact relationship to your map paper, and the prismatic compass determines the relation of the object to magnetic north.

A careful study of what is going on out of doors among the mountains, hills, and valleys has led to the development of a scientific study of the changes which are constantly taking place in topography. Once people thought that the hills were everlasting, but that is a false notion. Farmers have seen their lands washed away during a heavy rainfall. Other farmers have seen their soils blown away. Some who have placed their home or farm on the bank of a river have lost everything they had as the river undermined the bank. Every river is at work deepening, widening, and lengthening its valley. Valleys are constantly changing in shape. When they are young they are commonly "V"-shaped. As they become mature they are broad and open and more like the letter "U." When they are much older they become broad and the banks become low. There are broad flood plains in the old valleys, lowlands which are often covered at high-water stages. The old rivers, like the lower Mississippi of today, wind about in their flood plains. Most valleys pass through the stages of youth, maturity, and old age.

Every mountain comes into existence slowly

and as the land is uplifted it is carved into beautiful forms with fantastic features. In time it is worn away and may disappear completely. Thus there are mountains in a youthful stage, others that are maturely dissected, and still others that are very old and subdued. The young, rugged mountains like the Rockies, Sierras, Alps, Himalayas, and all lofty ranges are in their youth. The old, worn-out mountains that are subdued and softened are like those in New England or the Adirondacks of New York State or the Great Smokies of the Carolinas. There are just such old mountains in southern Germany, in Scotland, England, and southern China.

If you become interested in topography you will find that there is no place on the surface of the earth that does not present problems which challenge your ability to interpret the history of the physical landscape of that area. Every part of the land surface of the earth becomes interesting to you. The science of topography is simple enough for any one. The science which deals with the evolution or changes taking place in the relief features or topography of the earth is called *Geomorphology*. See also *Map*.



TOPOLOGY

In this field of geometry, the size and shape of figures have no meaning

Topology (*tô-pôll'ô-ñ*), also known as ANALYSIS SITUS (analysis of position), a general kind of geometry which has been developed in the last 100 years. It consists of a study of those properties of figures, called topological properties, which remain unchanged under continuous transformations. Thus, while Euclidean geometry, a special case of topology, concerns itself with the study of the properties of figures which are preserved under rigid motions, topology is concerned with those properties which do not change as the figures are deformed.

A triangle, square, ellipse, or circle are all said to be topologically equivalent, since any one can be transformed into the other by a continuous stretching, without breaking, of the line segments. For this reason, topology is frequently referred to as "rubber-sheet" geometry.

In topology the size and shape of figures have no meaning. Each of the figures accompanying this article is called a simple closed curve and has the common property, known as the Jordan-curve theorem, that divides the plane into two regions, an inside and an outside of the curve.

All simple closed curves are topologically equivalent because each can be transformed continuously into the other. On the other hand, a circle and a line segment are not topologically equivalent because one cannot be deformed into the other.

The study of topology has been found to have value in the theory of functions of complex variables. In this area, as well as in analysis, the Jordan theorem is frequently used. Topology has also proved to be of importance in applications to physical science.

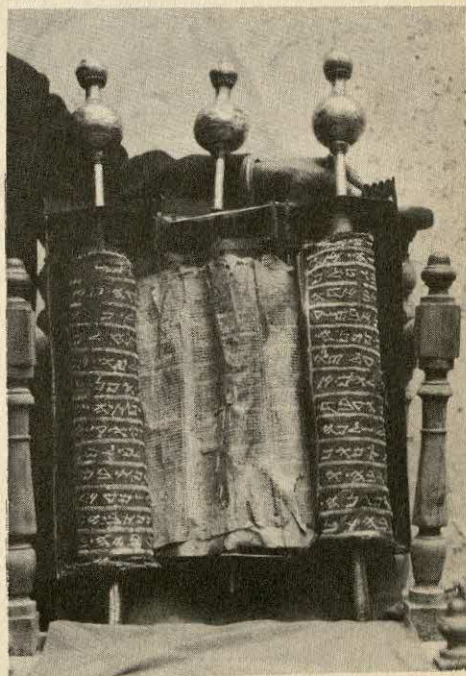
Torah (*tô'râ*) or THORA, a word probably derived from the Hebrew *Yorah* meaning "to learn." In ancient Hebrew literature and tradition, the term is applied to any decision or instruction in matters of law and conduct given by sacred authority. The word now refers specifically to the Law of Moses (*Tôrath Môshe*), and by extension to the whole of the Pentateuch, including the historical as well as the legal portions.

Tordesillas (*tor-THâ-se'[l]yäs*), TREATY (or CONVENTION) OF, an agreement between Spain and Portugal, signed at Tordesillas, a village in northern Spain, on June 7, 1494. It shifted the line drawn by Pope Alexander VI in 1493, regulating Spanish and Portuguese rights of discovery and conquest in the New World, from 100

leagues w. of the Cape Verde Islands to 370 leagues w. of these islands. Spain was given rights to territory west of the line and Portugal to territory east of the line.

Torero (*tô-râ-rô*), in bullfighting, the person who fights the bull on foot. See also *Bullfighting*.

Torgau (*tôr'gow*), a town in central Germany, on the Elbe River, 30 m. N.E. of Leipzig. Its manufactures include paper, glass, ceramics, and machinery. Located at a strategic crossing-point of the Elbe, the town grew up around the site of a castle and was first mentioned in the 13th century. The buildings of the present castle, Schloss Hartenfels, date from the 16th and 17th centuries and house a collection of Saxon antiquities. The castle church in Torgau, consecrated by Martin Luther in 1544, is the first Protestant church built in Germany. In 1760 Frederick the Great (*q.v.*) defeated the Austrians in the vicinity of Torgau. On April 27, 1945, advance patrols of the U.S. and Soviet armies



Courtesy Canadian Pacific Railway

TORAH

Scroll dating back to the 1st century A.D.



TORONTO

The downtown area at night of the capital city of the Canadian Province of Ontario (courtesy Ewing Galloway, N.Y.)

met at Torgau (see *World War II*). After the war, the town was included in the Russian occupation zone. Population, *ca.* 19,000.

Tornado (*tôr-nă'dō*). See *Storm*.

Torne (*tôr'ne*), a river in Sweden which rises near the Norwegian frontier by draining Torne Träsk, a lake 124 sq. m. in area. The river flows southeast for *ca.* 250 m., emptying into the Gulf of Bothnia. The lower course of the river is joined with the Muonio River and forms part of the border between Sweden and Finland. Haparanda, Sweden, and Tornio, Finland, are situated at the mouth of the Torne.

Toronto (*tû-rôn'tô*), the second-largest city in Canada, capital of the Province of Ontario, county seat of York County, *ca.* 60 m. n.w. of Buffalo, N.Y. The city, situated on the northwest shore of Lake Ontario at the mouth of the Humber River, covers an area of 34.9 sq. m. It is served by the Canadian National and the Canadian Pacific R.R.'s. Malton airport is 18 m. n.w. of the city.

An important lake port on the St. Lawrence Seaway, Toronto has 12 m. of harbor installations on Toronto Bay and can accommodate large ocean-going vessels. The city is a center of business, commerce, and industry. Its manufactures include aircraft, clothing, machinery, printing products, electrical equipment, rubber products, paper boxes, and bakery, meat, and other food products. The surrounding countryside is a rolling upland of fertile farmland, and its agricultural output includes fruits, grains, and dairy products.

Toronto has about 1,835 acres of parks and recreational areas. Nearby are resorts with facilities for winter and summer sports. Exhibition Park, comprising 350 acres with a 1.5-m. frontage on Lake Ontario, is the permanent site of the Canadian National Exhibition, the world's largest annual fair, and the Royal Agricultural Winter Fair, an annual agricultural, livestock,

and horse show. Other parks include Riverdale Park and Zoo, and Ashbridge, Rose Hill, Sir Winston Churchill, and Toronto Island parks.

The city's leading institution of higher learning is the Univ. of Toronto, founded in 1827 and opened in 1843. It comprises University Coll., federated with Victoria, Trinity, and St. Michael's colleges, supported, respectively, by the United, the Anglican, and the Roman Catholic churches. There are three theological colleges federated with the university: Knox (Presbyterian), Wycliffe (Anglican), and Emmanuel (United Church). Also affiliated are the Ontario Agricultural Coll. and the Ontario Veterinary Coll. at Guelph, and the Ontario Coll. of Art. The Royal Ontario Museum and the Royal Conservatory of Music are also within the university system. The fulltime student enrollment totals *ca.* 10,000 annually, the faculty numbers 1,400, and the library has more than 800,000 items. Toronto is also the seat of the Banting and Best Inst. of Medical Research and of Osgoode Hall Law School.

The Toronto municipal government is headed by a mayor and boards of controllers and aldermen. The city is part of Metropolitan Toronto, incorporated in 1953, a group of 13 municipalities operating under a federal system of government headed by the metropolitan council. The council consists of 12 representatives of Toronto and one each from the 12 suburban communities. The total area of Metropolitan Toronto is 239.7 sq. m. The population in 1957 was 1,380,000.

Toronto (an Indian name meaning "the meeting place") was laid out in 1793 and later in the same year changed its name to York. In 1813, during the War of 1812, it was the site of the battle of York. After capturing Ft. York (now a historical landmark), U.S. troops sacked and burned the town. The city of Toronto was incorporated in 1834. Population, 1941, 667,457; 1951, 675,754; 1956, 662,096.

STATE FLAGS AND FLOWERS III



OHIO
Buckeye State



Scarlet Carnation



OKLAHOMA
Sooner State



Mistletoe



OREGON
Beaver State



Oregon Grape



PENNSYLVANIA
Keystone State



Mountain Laurel



RHODE ISLAND
Little Rhody



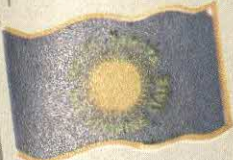
Violet



SOUTH CAROLINA
Palmetto State



Yellow Jessamine



SOUTH DAKOTA
Coyote State



Pasque Flower



TENNESSEE
Volunteer State



Iris



TEXAS
Lone Star State



Bluebonnet



UTAH
Beehive State



Sego Lily



VERMONT
Green Mountain State



Red Clover



VIRGINIA
Old Dominion State



Dogwood



WASHINGTON
Evergreen State



Western Rhododendron



WEST VIRGINIA
Mountain or Panhandle State



Big Rhododendron



WISCONSIN
Badger State



Violet



WYOMING
Equality State



Indian Paint Brush

NEW STATES ADDED TO THE UNION



ALASKA
Great Land



Forget-Me-Not



HAWAII
Paradise of the Pacific



Hibiscus

Stories of American Flags and Flowers

The American colonies used a number of local flags and badges while under English rule, and with the start of the Revolution the thirteen devised banners and seals of their own. Some of these, changed but slightly, are now official state flags. Quite a few adopted a dark blue flag with the early state seal in the middle. The idea of each state having its own flag was agreed upon as early as the Constitutional Convention of 1787. Most of these flags were not officially approved by the state legislatures and general assemblies, however, until the late 1800's and the early 1900's.

Many of the Southern states have adopted various forms of Confederate banners. The Maryland flag, representing the arms of the family of Calvert—the family of Lord Baltimore—is the oldest in continuous use, having been used locally since 1634, although not officially adopted until 1904. Three flags were used by short-lived independent republics before becoming state flags. The Texas Republic used today's Lone Star Flag from 1839 to 1845, and the California Republic used the Bear Flag for one month in 1846. Independent South Carolina flew the crescent and palmetto for a week, after it seceded from the Union and before it joined the Confederacy, in 1861.

The two newest states have flags with interesting stories. Alaska's star flag, representing the Great Bear, or Big Dipper, constellation, was designed by a 13-year-old boy, winner of a contest held in 1927. Hawaii's flag includes the British Union Jack in the corner, not because Hawaii ever belonged to England, but because the explorer George Vancouver gave a British flag to the Hawaiian king in 1793. The stripes were added in the early 1800's; perhaps following the American flag pattern, the eight stripes represent the eight principal islands.

Flowers, used as family and national emblems throughout history, have been selected in the U.S. by state bodies, patriotic organizations, and school children. The floral emblems of Mississippi, New York, Rhode Island, and Wisconsin were voted upon only by the school children of the state. New York's rose, the first official flower chosen, won a contest held by the children in 1891 but, like Delaware's peach blossom, has never been approved by state legislative action. Both the wild rose and the goldenrod, the latter the official flower of three states, have been suggested as the official emblem of the nation, but no action has ever been taken. The violet has been adopted by four states, the most selecting any one flower. In some cases, flowers have been chosen or voted upon by statewide groups long prior to official adoption. Between 1913 and 1931, Indiana officially changed its mind three times.

While wild flowers predominate, tree blossoms, used by several states, are represented by the American dogwood, the peach blossom, the apple blossom, the orange blossom, the magnolia blossom, and the pine cone and tassel of Maine—the only one not strictly a flower.

With the exception of the scarlet carnation of Ohio, chosen because of its favor with native son President William McKinley, the state flowers generally represent the typical flora of each state.

Torpedo (*tôr-pê'dô*), a group of fishes related to the ray (*q.v.*), having a blunt snout and flat body. Some six species are commonly found in the Atlantic and Indian oceans, but there are many allied species often spoken of as belonging to the same group. They vary in size; the larger specimens are about 4 ft. long and 2 ft. wide at the head, averaging in weight about 30 lb., although some are said to have attained a weight of 200 lb. They have electrical organs, two kidney-shaped enlargements, one on each side of the head, containing many thousand plates and prisms. These organs convert nervous energy into electricity, with which the fish defends itself or subdues its prey. Full-grown torpedoes of the larger species are able to inflict a severe shock, healthy specimens being able to stun a man. Two such American species, one in the Atlantic and one in the Pacific, are dark brown above and white beneath; some attain lengths of nearly 5 ft.

Torpedo, an offensive weapon for use under water, charged with guncotton or similar high explosives. Cigarlike in shape, torpedoes are virtually miniature warships, containing within their 24-ft.-long, 21-in.-diametered bodies an engine room, cargo, and mechanical crew. The cargo comprises varying amounts of high explosives, carried in the nose and exploded by concussion on striking the target. Locomotive power is derived from compressed air, enclosed in a chamber abaft the explosive chamber. In all, a torpedo weighs about 3,000 lb. and travels at about a mile a minute.

Robert Fulton demonstrated (1805) the possibility of breaching a vessel by exploding a charge against its hull under water, and during the Civil War (1861-65) a device known as the "outrigger" torpedo came into use. This consisted of a 40-ft.-long pole, projecting over the bow of the boat, with a charge of guncotton at its tip about 10 ft. below the water's surface. When this was brought into contact with the bottom of the enemy vessel, the gun-

cotton was exploded by electricity.

The first self-propelled torpedo is credited to the English engineer, Robert Whitehead, about ten years after the American Civil War. About this time, a succession of controllable torpedoes appeared. Except for one model, introduced by J. H. Hammond, Jr., in 1915, most of them were discarded as impracticable.

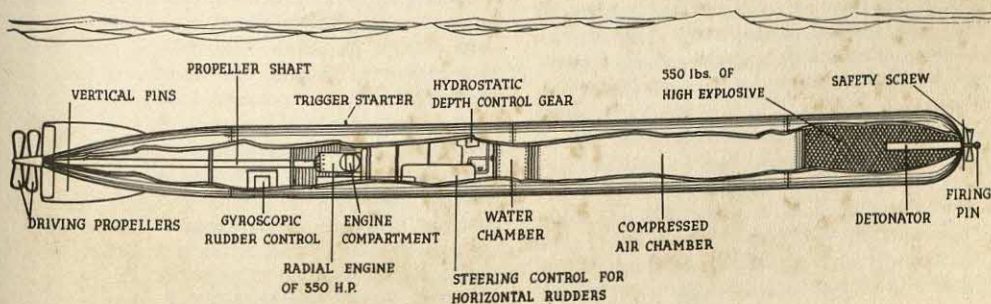
The self-propelled torpedo was first used in the Russo-Turkish War of 1877. Modifications of this type, with ever-increasing deadliness, have been used ever since. With the development of the submarine (*q.v.*), the torpedo's ultimate importance was realized. During World War I, the torpedo was fired from submarines with almost 100 per cent effectiveness. The German navy, in particular, placed great emphasis on this type of warfare. However, improvement in armor plating and improvements (introduced in World War II) in watertight compartments somewhat increased defense against torpedoes. Nevertheless, the weapon was used effectively throughout the war, and the development of a wakeless torpedo, which is driven by electric power, further increased its value in modern sea warfare.

Torpedo Boat, **MOTOR** (*tôr-pê'dô bôt, mô'tôr*), (MTB, also known as **PATROL TORPEDO CRAFT** or **PT BOAT**), a small vessel for use in warfare, armed principally with torpedoes. Somewhat like speed-boats, motor torpedo boats have an over-all length of about 120 ft., a displacement up to 300 tons, and a speed of about 50 m.p.h. They are manned by one officer and a crew of 14. Armament includes four torpedoes, four .50-caliber machine guns, and (sometimes) depth charges. In warfare, MTB's are used for piloting, patrolling, rescuing, and for daring missions which larger craft could not carry out. Their speed and small size give them maneuverability, and they are important in antisubmarine patrols.

The first vessel of this type was built in 1875 for the British navy, and within 25 years most of the navies of the world used them. The forerunner of the modern craft was developed by

DIAGRAM OF A TORPEDO

Courtesy British Information Services, N. Y.





Official U. S. Navy Photo

TORPEDO BOAT

Italy for use in World War I. The U.S. did not officially adopt craft of this type until 1939, by which time England and Italy both were counting torpedo boats as an integral part of their navies. In World War II, President John F. Kennedy, then a Navy lieutenant, commanded (1943) an MTB which was cut in half by a Japanese destroyer. By heroic effort Kennedy managed to save all but two of his crew.

Torquay (*tôr-kê'*), a municipal borough in Devonshire, England, on Torbay, *ca.* 19 m. s. of Exeter. Because of its excellent climate, it is known chiefly as a resort, and it is the site of an annual yacht regatta. There is some manufacturing, principally of pottery and terra cotta. Among the points of interest are the ruins of the 12th-century Tor Abbey and the Spanish Barn, where prisoners from the Spanish Armada were held in 1588. Torbay, an arm of the English Channel, was the site of the landing of William III (*q.v.*) in 1688. Population, 1951, 53,216.

Torquemada (*tôr-kâ-mă'THä*), TOMÁS DE, inquisitor general, born in Valladolid, Spain, in 1402; died in Ávila, Sept. 16, 1498. He served as prior of the Dominican monastery at Segovia and was confessor to Queen Isabella and later to King Ferdinand of Spain. When the Inquisition (*q.v.*) was initiated in 1478, Torquemada was a consultant and an assistant inquisitor, before becoming inquisitor general in 1483. In the latter post he reorganized the Inquisition and set up standard rules of procedure under which an estimated 100,000 cases were tried during his tenure in office, resulting in *ca.* 2,000 executions. He gained a reputation for great cruelty because of the severity with which he discharged his office, although some historians consider the charge somewhat exaggerated. Under his directorship, the crimes of witchcraft (*q.v.*), necromancy, bigamy, blasphemy, and usury were put under the jurisdiction of the Inquisition in addition to those of heresy and apostasy. Torquemada also was instrumental in bringing about the expulsion of the Jews and Moors from Spain. See also *Torture*.

Torrance (*tôr'äns*), a city in southwestern California, in Los Angeles County, 15 m. s.w. of Los Angeles. The Atchison, Topeka and Santa Fe Ry. supplies freight service. Los Angeles International Airport is 8 m. n. of the city.

A planned city, Torrance is known for its combined character as an industrial, commercial, and residential community. Its industries include oil

TORRES STRAIT

refining and the manufacture of steel, aluminum, aircraft, and chemicals. In 1958 the city had a value added by manufacture of \$119,530,000. It is part of the Los Angeles-Long Beach standard metropolitan statistical area (1960 pop., 6,742,696), which includes all of Los Angeles and Orange counties.

Torrance was settled in 1912 and incorporated as a city in 1921. In 1947 it adopted a city manager-council system of government, with a six-member council and a mayor elected at large. In 1940 it had a population of 9,950; in 1950, 22,241. In the ensuing decade the population showed a phenomenal growth of some 350 per cent, reaching 100,991 in 1960.

Torrence (*tôr'ens*), (FREDERIC) RIDGELY, writer, born in Xenia, Ohio, Nov. 27, 1875; died in New York, N.Y., Dec. 25, 1950. Educated at Miami Univ., Ohio, and at Princeton Univ., he was a librarian (1897-1903) and then served on the editorial staffs of several publications. He taught (1920-21) at Miami Univ. and was a resident in creative writing at Antioch Coll. in 1938. Torrence's published verse includes "The House of a Hundred Lights" (1900), "Hesperides" (1925), and "Poems" (1941), which won the Shelley Memorial Award. Among his dramatic works are "El Dorado: A Tragedy" (1903); "Abelard and Heloise" (1907), a poetic drama; "Granny Maumee" and "Simon the Cyrenian" (1917), both written for the Negro theater; and "Common Sense" (1941). He is credited with being the first dramatist to explore Negro folkways, thus launching the Negro theater. Torrence also edited "Selected Letters of Edwin Arlington Robinson" (1940) and "Last Poems of Anna Hempstead Branch" (1944) and wrote a biography, "The Story of John Hope" (1948). He is best known as a poet, and his works, rich in musical quality, have been compared with Shelley's.

Torrens (*tôr'ënz*), a salt lake in the south central part of South Australia. It is 130 m. long and 40 m. wide and lies 25 ft. below sea level. Very shallow at all times, the lake is partly dry in summer.

Torrens System (*tôr'ënz sî'stəm*), a system of keeping records of titles to real estate. It was devised by Sir Robert Torrens (1814-84), who introduced it in South Australia in 1857. His purpose was to simplify the transfer of landed property. The system consists of recording a certificate of ownership of property; the registration is thereafter evidence of title. If a valid claim is made on the property at a later date, an insurance fund, set up with the money from registration fees, pays for a settlement. The Torrens system is in use in much of the British Commonwealth and in about 20 states in the U.S.

Torres Strait (*tôr'ëz strät*), a channel sepa-

rating New Guinea from Australia. It was so named from Torres, who discovered it in 1606. It is 80 m. wide and is difficult to navigate on account of numerous reefs and shoals. Cape York, the northernmost point of Australia, projects into it.

Torrey (tôr'i), JOHN, botanist, born in New York City, Aug. 15, 1796; died Mar. 10, 1873. He possessed a fine botanical library, which he presented to Columbia Coll., New York. His writings include "Flora of the State of New York," "Catalogue of Plants Growing Within Thirty Miles of New York," "Flora of the Northern and Middle States," and "Flora of North America." In publishing the last-mentioned work he was assisted by his pupil, Asa Gray, who wrote a sketch of his life. Torrey contributed many articles to the *American Journal of Science*.

Toricelli (tôr-rê-chêl'le), EVANGELISTA, mathematician and physicist, born at Faenza, Italy, Oct. 15, 1608; died Oct. 25, 1647. Left fatherless at an early age, he was trained under the direction of the Jesuits, and in 1627 began the study of science under Benedetto Castelli at Rome. He went to Florence in 1641, where he was associated with Galileo for several months, and subsequently became professor of mathematics in the Florence Acad. His name is associated with the history of science mainly because he discovered the law on which the barometer depends. He wrote several treatises on mathematics and geometry, the most important being "Opera Geometrica."

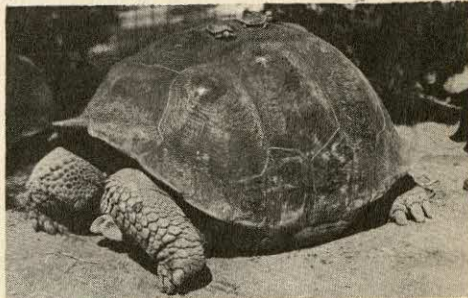
Torrington (tôr'ing-tŭn), a city in Litchfield County, Connecticut, on the Naugatuck River, 27 m. n.w. of Hartford. It is on the New York, New Haven & Hartford R.R. The city's manufactures include hardware, woolen goods, hosiery, radiators, needles, tobacco products, nails, and machinery. The place was first incorporated in 1740 and became a city in 1923. It was the birthplace of John Brown, the abolitionist. Population, 1950, 27,820.

Torsion Balance (tôr'shŭn bāl'ans), an apparatus used to measure delicate attractions and repulsions. The essential part consists of a metal wire, or a silk thread, to which a needle is attached, and the apparatus is suspended from a fixed point. The attraction or repulsion is measured by the resistance offered to it by the torsion of the wire, that is, by its being twisted.

Tort (tôrt), in law, a civil wrong or injury, in contradistinction from a crime against the public or state. Tort may be committed where a contract or other agreements exist, but it is not necessary that a claim for damages be based upon a contract, since torts are injuries or infringements of the civil rights that belong to individuals. However, an offense may be both a tort and a crime, as in the case of maintaining a nuisance or committing the offense of assault

and battery. In either of these cases the injured party may recover damages and the offender may be punished under the criminal law.

Tortoise (tôr'tŭs), the common name usually applied to land-inhabiting turtles of the sub-family Testudininae, characterized by their stumpy-like feet, which are provided with short digits having not more than two joints. Tortoises are generally distinguished by their relatively high, arched carapace, but some species have low, flattened carapaces. Among the common tortoises of North America are the *desert tortoise* of the southwestern U.S. and northwestern Mexico, *Berlandier's tortoise* of southeastern Texas and northeastern Mexico, and the *gopher tortoise* of the southeastern U.S. The more bizarre tortoises include the *hinge-back* tortoise of Africa, which has a hinge in the posterior portion of the carapace. The largest of the land turtles are the giant



GALAPAGOS TORTOISE

tortoises which inhabit various isolated islands in the Pacific and Indian oceans. See also color plate, *Turtles and Lizards*, Volume IX.

Tortoise Shell (shêl), the name commonly applied to the scales that cover the shell of the hawksbill, a large turtle found in the tropical seas. These scales are remarkable for their plastic quality and under the influence of heat may be formed into various shapes. It is possible to weld pieces of the shells under pressure when heated. Tortoise shell is used in the manufacture of luxury articles. The Romans used this material in veneering furniture, and products of this kind are still made by the Japanese. Horn and celluloid are used extensively as imitation of tortoise shell.

Tortugas (tôr-tôo'gâz). See *Dry Tortugas*.

Torture (tôr'chŭr), a form of punishment employed to extract evidence from unwilling witnesses, to compel confession by inflicting physical pain or mental suffering, or to increase the punishment after judicial conviction. The modes of punishment have been numerous, including the rack, an apparatus which stretches the body; the boot, containing pegs or wedges of iron; the thumbscrew; the scourge; and confinement in dungeons. Other forms have been to pour melted lead in the ears, to cut off the limbs, to put out

the eyes, to suspend the body over a slow-burning fire, to crush the body, and to crucify. The act of physical torture has often been designed to serve—at the same time—as a mental torture to the innocent bystander, who unwittingly identifies himself with the tormented.

Torture arose with the development of civilization and was perfected in the Middle Ages. The growing body of psychological knowledge, however, has vastly increased the recent development of mental torture as practiced by totalitarian states. While wholesale physical torments might increase resistance, implanting of well-directed fears and anxieties has been found to lead to the ultimate submission of a whole people to the aims of a dictator. In order to achieve the breakdown of traditional principles, every form of human communication is applied and misused. Constant verbal intimidation of the public is a recognized method of totalitarian strategy. Hitler, in using what he called his psychological artillery, employed a fifth column (*q.v.*) in enemy countries to spread rumors and provoke fear, confusion, and cynicism. Hitler knew that slogans can alarm or hypnotize the public, that people can be lulled by big lies into an uncritical attitude, and that spreading unrest will paralyze intelligent public opinion.

Pockets of resistance, offered either by a professional group or a class (*e.g.*, the kulaks), are broken by a well-defined method, which is applied to selected individuals whose influence is especially feared. In order to condition the individual into a desired pattern of behavior, modern dictators resort to imprisonment (thus separating a person from his group), to solitary confinement, and finally to the holding back of food. Daily interviews may be held under painful lights while the prisoner stands erect to the breaking point. Although not completely discarded, physical torture is avoided, in order not to kill the human instrument the tyrant might want to use. In the final phase of mental torture, narcotic drugs may be used to bring a person to complete submission. Such torture has been termed *menticide*, *mental coercion*, or *brain-washing*.

The "third degree,"¹ as practiced by a powerful tyrant or tyrannical group, comprises an organized system of psychological pressure in which thoughts and words are synthetically injected (by such techniques as mock trial) into the minds and mouths of the victims whose destruction is planned. In modern China, for instance, students

frequently must read their own diaries aloud in a group. In this exposure of themselves they are forced to express their inner thoughts and thus open themselves to attack from their fellows. This process of mutual brain-washing is the apotheosis of submission through self-accusation.

Cruel and unusual punishments are especially prohibited by the Constitution of the U.S. and in all democracies. See also *Inquisition*; *Witchcraft*.

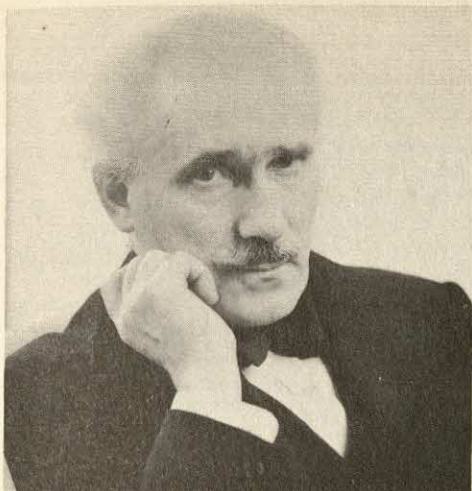
Toruń (*tō'rōon-i*), in German, THORN, a city in northern Poland, in the Pomorze department, on the Vistula River, 110 m. N.W. of Warsaw. Toruń is an agricultural trading center and has manufactures of furniture, food, electrical appliances, and linen. It is the seat of Copernicus Univ. (named for the astronomer, who was born here), opened since World War II. Other interesting buildings include the Gothic town hall and the parish church of St. John (built in the 13th and 14th centuries). Toruń was founded (1231) by the Teutonic Knights and was a member of the Hanseatic League. It was confirmed as a Polish city in 1466 but passed to Prussia in 1793, to the grand duchy of Warsaw in 1807, again to Prussia in 1815, and to Poland in 1919. In World War II it was occupied by the Germans from September 1939 until January 1945. Population, 1950 (est.), 75,734.

Tory (*tō'rī*), one of the two great English political parties which arose toward the end of the 17th century. The name was originally applied to certain Irish Roman Catholic outlaws but came to be used as a term of derogation for supporters of the Duke of York (later James II) at the time when his succession to the English throne was bitterly opposed because he was a Roman Catholic. (The rival party became known as *Whig*.) The Tory party favored the landed aristocracy and the Anglican Church and was opposed to foreign entanglements. Its leaders included Henry St. John, Viscount Bolingbroke; William Pitt; and the Duke of Wellington (*q.v.v.*). After the passage of the Reform Bill of 1832, which the Tories opposed, the party lost its position. Out of the Tory remnants was formed the Conservative party (*q.v.*); the word Tory is still in fairly common, though inaccurate, use as a synonym for the members of the Conservative party. During the American Revolution the British loyalists were called Tories.

Tory (*tō-rē*), GEOFFROY, type designer and printer, born in Bourges, France, *ca.* 1480; died in Paris, *ca.* 1533. After studying in Italy, he settled in Paris, where he became the royal printer. Tory designed many type faces, especially of roman character, and initiated the use of French accents, cedillas, etc., in French type faces.

Tosca (*tōs'kū*), LA, an opera in three acts by Giacomo Puccini, with a libretto adapted from

¹ The third degree is usually considered a method in which a prisoner is subjected to interrogation "around the clock," which is frequently conducted by more than one person and which may be accompanied by physical violence, starvation, and other violation of civil liberties at the hands of the police, who attempt to force the prisoner to confess against his will.



NBC Photo

ARTURO TOSCANINI

Victorien Sardou's play, "La Tosca." The opera was first produced in Rome, Italy, in 1900 and had its American *première* at New York's Metropolitan Opera House in 1901.

Toscanini (*tôs-ka-ně'ni*), ARTURO, musical conductor, born in Parma, Italy, March 25, 1867; died in Riverdale, N.Y., Jan. 16, 1957. A graduate (1885) of the Parma Conservatory and a cellist, he made his first public appearance as a conductor in a performance of "Aida" in Rio de Janeiro in 1886. After several years as conductor of an operatic stock company in Italy, he was (1898-1907) chief conductor for concert and opera at La Scala, Milan. He then conducted (1908-15) at the Metropolitan Opera House in New York City, returning to Italy during World War I. From 1921 to 1931 he was again chief conductor at La Scala and from 1928 to 1936 worked in varying capacities with the New York Philharmonic-Symphony Orchestra. Guest conductor of the Wagner Festival at Bayreuth (1930-31), he refused to return after the accession of Hitler, later (1934-36) directing at the Salzburg Festivals. He became noted for his anti-Fascist views. In 1937 he organized the National Broadcasting Company symphony orchestra, which he conducted regularly until his retirement in 1954.

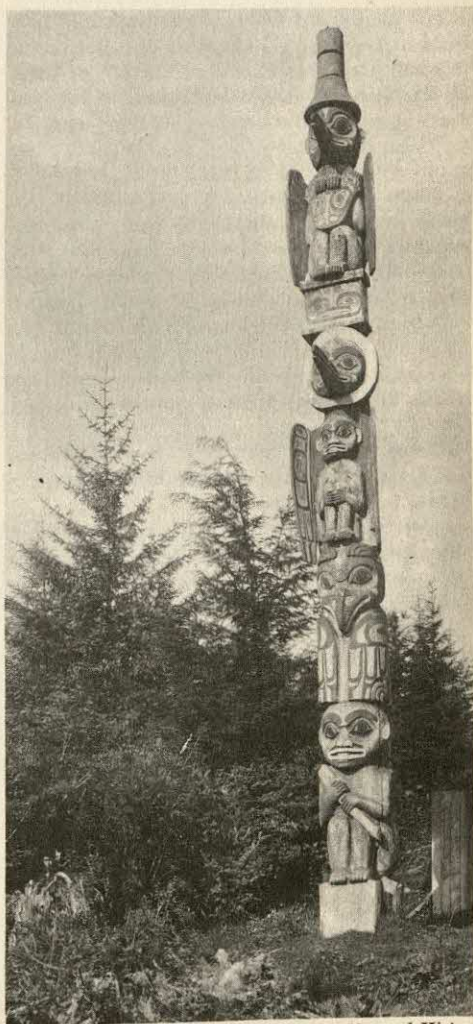
Often called the greatest conductor of all time, Toscanini conducted a vast repertory by memory, displaying a unique sense of rhythm and striving for perfection in every detail. Under his direction the Wagnerian operas became popular in Italy. He introduced many new works, among them Leoncavallo's "I Pagliacci" (1892); Puccini's "La Bohème" (1896) and "The Girl of the Golden West" (1910); and other operas. He also led the first performances of such works as Verdi's "Stabat Mater" and "Te Deum." His superb technique was an inspiration to orchestras and audiences all over the world.

TOTEMISM

Tosefta (*tô-sěf'ta*), Hebrew, meaning addition or supplement. The term denotes a collection of interpretations of the Torah (*q.v.*) by the Tannaim, a school which flourished in Palestine from ca. A.D. 10 to 200. This codification of the oral law is based on the Bible and is similar to the Mishna, although considered less authoritative.

Totalitarianism (*tô-tāl-ī-târ'ī-qn-iz'm*), a concept of government which is based on the political ideology of a "totality of the state." In the totalitarian state everybody and everything is subordinated to the demands of the government, reversing the rights of the individual guaranteed in a democracy (*q.v.*).

Totemism (*tô'tēm-iz'm*), a word irregularly derived from the Chippewa dialect of the Algon-



Courtesy American Museum of Natural History

ALASKAN TOTEM POLE

On the main street in the town of Wrangell

quian Indian language, used in a philosophical sense to designate a more or less definite set of practices centering around the belief, by some native peoples of Africa, Australia, some Pacific Islands, and particularly of North America, in the existence of a supernatural relationship between organized groups and a class of animals, birds, plants, or other distinctive objects which frequently serve as the badge or symbol for the group. Blood relationship determines the totemic group, and descent is either through the male or female line. A consistent feature of such groups, usually called clans, is exogamy—the partner in marriage must come from another clan. A person born into the clan acquires its guardian spirit. There is no choice in the matter. Individuals, however, may obtain personal deities through the rite of vision in a trance or dream.

The sporadic and widespread distribution of totem-exogamy is attributed to diffusion by some authorities and to independent invention or parallelism (*q.v.*) by others. If the latter proves to be true, it may be regarded as a manifestation of psychological forces determining the phenomena of culture or civilization.

The extraordinary development of conventionalized art on the North Pacific Coast from Vancouver Island to Alaska was an outgrowth of totemic ideas. The elaborate symbols used on totem poles and house fronts were mainly clan and family totems, although occasionally the figure of some individual was added, and there were representations of events in personal or clan history.

Totems along the Northwest Coast of America were divided into three main classifications: genealogical, mortuary, and house. Genealogical or commemorative totems were erected either attached to or free-standing from the houses and displayed the importance of the owner's predecessors through deeds actually performed by or mythically ascribed to them. Genealogical totems were the most numerous. Mortuary totems depicted the crest of the clan, usually by a single carved figure either on, or superimposed on, the pole. Backs of the poles were carved out to receive the ashes of the deceased, all of whom, except the medicine men, were cremated. House totems served as structural supports for the heavy roof-framing members.

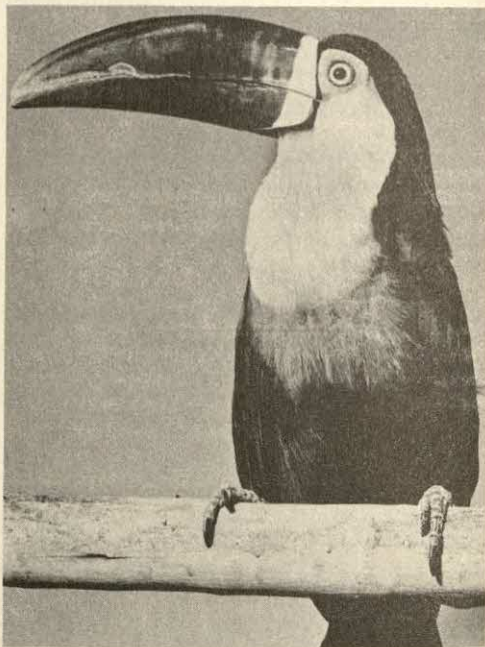
The practice of totemism, which was strongly held by the older generations, is practically non-existent now.

Totila (*tōt'la*) or TOTILAS, king of the Ostrogoths, died in battle at Taginae (near modern Gubbio), Italy, July 552. In 541, at the beginning of his reign, he led the Goths in a victory over the forces of Justinian I at Faenza, Italy. Within the next ten years, Totila gained control over central and southern Italy, capturing Naples in

543 and Rome in 546. Rome was retaken (547) by the Byzantine general Belisarius (*q.v.*), but it fell once more (549) to the Ostrogoths, after Belisarius had been recalled (548) to Constantinople. Totila advanced to Sicily, Corsica, and Sardinia and sent a fleet to the Dalmatian coast. In 552, however, a powerful Roman army under Narses (*q.v.*) routed his forces at Taginae in the Apennines, and Totila himself was slain.

Totleben (*tōt'la-ben*), EDUARD. See *Todleben*.

Toucan (*tōō'kän*), a member of a family of birds restricted to the American tropics, from



Arthur W. Ambler, from *National Audubon Society*

ARIEL TOUCAN

Brilliantly colored bird of the American tropics

Mexico to Peru and northern Argentina, but not in the West Indies. The toucans are of medium size, the largest about the size of a crow. Most of them have gaudy color somewhere in the plumage and often on their bills, where bizarre patterns are developed. The bills are large and often swollen but are very light due to the internal structure. The birds' legs are short, and the long bill may enable them to reach the fruit on which they feed, which might otherwise be inaccessible. About 40 species are recognized.

Touch (*tūch*), the sense of feeling, which gives man cognizance of solidity, temperature, smoothness, and other palpable properties of bodies. It is frequently called the *general sense*, since its nerves are spread over the whole body and by it we become conscious of all sensory impressions which are not the objects of the four

special senses of taste, sight, smell, or hearing. The principal end organs of the nerves of touch, called the *papillae*, which are minute conical projections covering the cutis, are in the skin. Each one of these papillae contains the tiny nerve twigs, which receive impressions and transmit them to the brain, where perception is produced.

Although there are terminal organs of the sensory nerves all over the body, the sense of touch is more acute in some places than in others, owing to the presence of a greater number of papillae. The points of the fingers are more sensitive than any other part of the body, being able to convey the largest number of different impressions, but the forehead requires less pressure to receive sensations than any other portion. Keeness of touch is likewise found in the tongue and the red parts of the lips. The least acute surfaces are those of the middle arm and thigh and of the middle of the back and the neck. This may be demonstrated by placing two objects in contact with the neck, when the sensation produced is that of one object, though the two points in contact with the skin are a short distance apart. The sense of touch is capable of a wide range of cultivation.

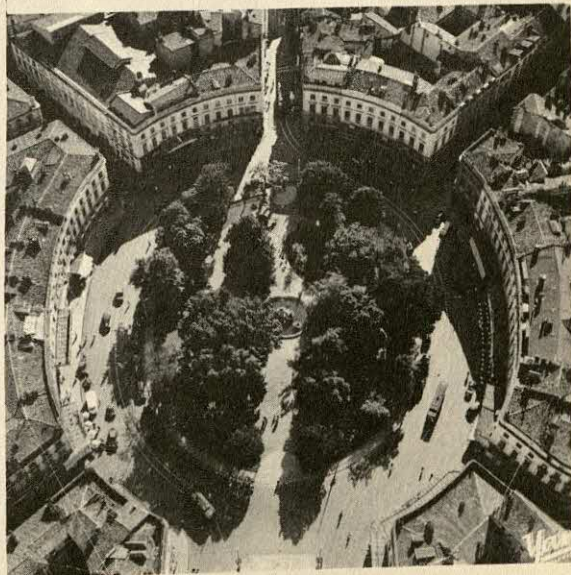
Touch-Me-Not (*tűch'mē-nőt*), any member of a widely distributed genus (*Impatiens*) of wild and cultivated plants, all characterized by explosive seed pods which burst open at a touch and scatter their seeds. The garden touch-me-nots, or balsams, include annuals and perennials. The wild variety is also called jewelweed or snapweed and has yellow or orange pendant flowers.

Touchstone (*tűch'stŏn*), a dark, fine-grained variety of schist or jasper, formerly much used for testing the quality of alloys of the precious

metals. The alloy was rubbed on the stone, and the color of the streak was compared with that of various alloys of known composition prepared for that purpose and called *touch needles*. The ease and speed with which exact assays of gold and silver are now made have rendered the touchstone obsolete.

Toulon (*tŏŏ-lŏn'*), a city of France, in the department of Var, 35 m. E. of Marseilles. The second-largest naval base of France, Toulon is dominated by a heavily fortified mountain. The city has blast furnaces and a marine arsenal; manufactures include shoes, leather, clothing, and machinery. The shipyards of La Seyne build warships and commercial vessels. Toulon dates from pre-Roman times and has been French since 1481. In 1793 it was surrendered to the British by French royalist forces but was recaptured by the Revolutionary armies later in the year; in this action Napoleon Bonaparte, a lieutenant in command of a battery, won his first victory and attracted national attention. In World War II, when the Germans marched into southern France in 1942, upsetting terms of the 1940 armistice, a large part of the French fleet was scuttled in Toulon harbor. The city, which suffered heavy damage in the war, was recaptured by the French in 1944. Population, 1946, 125,742.

Toulouse (*tŏŏ-lŏŏz'*), a city of France, in the department of Haute-Garonne, on the Garonne River, 140 m. S.E. of Bordeaux. It is on a number of important railroad lines. The city has several institutions of higher learning, including a university, established in 1230. Among the noteworthy buildings are the Cathedral of St. Étienne, the municipal theater, the palace of justice, the central railroad station, the Church of St. Sernin,



TOULOUSE, FRANCE

This aerial view of the heart of the city shows Wilson Square, named for the American President, Woodrow Wilson (courtesy French Embassy Press & Information Division)

the museum, the university, and several hospitals, asylums, and professional institutions. It has a number of associations of science, art, law, and economics. Manufactures include glass, paper, leather, starch, macaroni, pottery, furniture, flour, saddlery, tobacco products, machinery, cutlery, wine, and musical instruments. It has a large trade in raw and manufactured silk. Toulouse was made the capital of the Visigoths in the 5th century. On Apr. 10, 1814, it was the scene of a battle, in which the French under Soult were defeated by the allies under Wellington. Population, 1946, 264,411.

Toulouse-Lautrec Monfa (*tōō-lōōz'-lō-trēk' mōn-fā'*), COUNT HENRI DE, painter, born Nov. 24, 1864, at Albi, France; died Sept. 9, 1901, in Paris. The son of a wealthy nobleman, he was always weak and sickly and after an accident in childhood in which he broke both of his legs, he was actually a cripple. In 1882 he began studying art, showing impressionist influence clearly from the beginning. The greatest influences on his own work were the paintings of Degas and Japanese prints, the latter having influenced also Degas. Toulouse-Lautrec first became known as a designer of posters and lithographs. It is the topic which soon characterized the works of Toulouse-Lautrec: observing and ironically penetrating the life of Paris, it was the circus, the night life at Montmartre, the race courses, etc., that caught his interest, and whether in a poster

for a cabaret or theater performance, or in an oil painting, his outspoken lines and colors, and his impressionistic composition have a very strong power. His many representations of the great singer and diseuse Yvette Guilbert are especially well known.

Tourcoing (*tōōr-kuān'*), a city in northern France, in the department of Le Nord, 7 m. N.E. of Lille. It has railroad facilities and is in an agricultural and fruit-growing region. Among the chief buildings are the city hall, the public library, and the Gothic church. The city manufactures cotton, linen, wool, and silk textiles, employing about 50,000 spindles. Other manufactures include carpets, woven goods, soap, sugar, furniture, dyes, and machinery. Population, 1946, 76,080.

Tourgee (*tōōr-zhā'*), ALBION WINEGAR, lawyer, journalist and author, born in Williamsfield, Ohio, May 2, 1838; died May 21, 1905. He studied at the Univ. of Rochester, and in 1861 enlisted in the Union army. After the war he practiced law in Greensboro, N.C., was a member of the state constitutional conventions of 1868 and 1875, and in the meantime published the *Union Register*. In 1868, he was chosen judge of the North Carolina superior court. His first published work, "A Fool's Errand, by One of the Fools" (1879) treats of his experience in connection with Southern sentiment. From 1882-84 he published the *New York Continent* and in 1889 became professor in the Buffalo Law School. His principal works include "Figs and Thistles," "The Battle of the Standards," and "An Appeal to Caesar."

Tourmaline (*tōōr'-mā-līn*), a crystalline mineral ranked among the gems, occurring in primitive rocks, usually in gneiss, granite, and mica slate. It includes opaque, transparent, and translucent species. The principal components are silica and alumina, these forming about three-fourths of the whole, the remainder being largely lime, magnesia, fluorine, iron, manganese, potash, and other substances. The prevailing colors are red, green, blue, brown, and black, though colorless specimens are not rare. It crystallizes in prisms that are either three- or six-sided and has a vitreous luster. Tourmaline is a double-refracting crystal and has the property of polarizing light. Jewelers prize the fine specimens, though they are comparatively rare. Tourmaline occurs in Siberia, Brazil, Ceylon, New Brunswick, New Hampshire, California, Vermont, and New York. See also color plate, *Precious Stones*, Volume IX.

Tournament (*tōōr'-nā-mēt*), a military sport practiced in the Middle Ages by armed knights, usually as an exercise of skill at some great event, as a royal marriage or military festival. The knights were mounted on horseback, the

MADAME PASCAL

PAINTING BY HENRI DE TOULOUSE-LAUTREC



name tournament coming from the skill exercised in turning the horses while taking part in the contest. A single contest between two knights was called a *joust*, while the name *tournament* was applied to a number of jousts and to combats among several parties of knights. They were held by the solicitation of princes or nobles, who sent out invitations by heralds, but certain qualifications of birth were required for admission. The contests took place within an open space surrounded by a rope or railing, and around it were galleries for spectators, heralds, and the judges. Each knight carried a shield, generally adorned with some device of a lady's favor. After the prizes were awarded by the judges, they were delivered to the successful knights by the queen of beauty, who was chosen by the lady spectators.

The practice of holding tournaments reached its full perfection in France and Germany in the 9th and 10th centuries, and was introduced into England shortly after the Norman conquest. In most countries the arms employed were made especially for the purpose, the lances being without heads and the swords blunt. The ordinary weapons of warfare were used on some occasions, and it was not infrequent to arouse angry passions that resulted in severe injury or death. The fact that Henry II of France received a fatal wound at a tournament aroused much opposition to the sport and the practice was finally abandoned with the decline of chivalry. Tournaments were given in America to a limited extent as a sport, but the practice never gained a wide foothold.

Tourniquet (*tōōr'ñi-kēt*), a device used to check the flow of blood from wounds. See *First Aid*.

Tours (*tōōr*), a city in France, capital of the department of Indre-et-Loire, 130 m. s.w. of Paris. It occupies an imposing site at the junction of the Cher and Loire Rivers, has numerous railroads, and is famous for its manufacture of silk. Two suspension bridges and a fine stone bridge 1,225 ft. long cross the Loire. It has a beautiful cathedral, St. Gatien, which, after the original 12th-century structure was burnt (1166) was erected from 1170 on. It was begun in Gothic style but not finished before the 16th century, and therefore shows also the rich decoration of the Flamboyant and early Renaissance styles. Besides many other churches, public monuments, the museum, and the library are noteworthy buildings. Besides a large output of silk, it has manufactures of stained glass, shoes, carpets, edged tools, paint, pottery, and wine. The silk industry was introduced from Italy under Louis XI, and flourished especially in the 15th to 17th centuries. Tours lost many of its most skilled Protestant artisans at the revocation

of the Edict of Nantes (*q.v.*), a loss from which it never recovered. At Tours was fought a battle (732) in which Charles Martel defeated the Saracens who, pressing onward from Spain, tried to conquer France and other parts of western Europe. The German army occupied it in the Franco-Prussian War and during World War II. Population, 1946, 80,044.

Tourville (*tōōr-vēl'*), ANNE-HILARION DE CO-TENTIN, COMTE DE, naval officer, born at the Château de Tourville, La Manche, France, Nov. 24, 1642; died in Paris, France, May 28, 1701. In 1656, he began naval service with the Order of Malta against the Barbary pirates. He became an officer in the French Royal Navy in 1667. He commanded in battles against the Dutch and, in the Mediterranean, against Algerian and Tripolitanian pirates, and was named commander-in-chief of the French naval forces (1689) sent to fight the English navy. A year later, he defeated the British-Dutch fleet at Beachy Head, but was routed in the Battle of La Hogue in the English Channel (1692). The following year he was made marshal of France. He retired in 1697.

Toussaint (*tōō-sān'*), FRANÇOIS DOMINIQUE, surnamed *L'Ouverture*, West Indian revolutionist, born near Cape François, Haiti, May 20, 1746; died near Besancon, France, Apr. 27, 1803. He was descended from slave parents, being the second son of an African chief who had been captured and enslaved. In 1791, the colored people of Haiti organized a revolutionary movement against France and he joined the insurgents, acting for some time as physician of the forces. Subsequently he became military leader of the insurgents and as such demonstrated eminent ability in conquering the island. The English invaded Haiti in 1793, but France having declared all slaves free, he sided with the latter, and in 1797 forced the English army to surrender. He was soon after made commander-in-chief of Santo Domingo. His management was upright and vigorous, giving encouragement to trade, agriculture, and internal improvements. The Spanish forces occupying the eastern part of the island were soon forced to yield their claims, thus making Toussaint the chief influence on the island, which he governed as president under France.

A constitution was adopted under his direction, which vested the government in a council of nine members, formed of one mulatto and eight white citizens. This constitution was opposed by Napoleon, who soon after issued a proclamation re-establishing slavery. To carry out this edict he sent an army of 30,000 men and a squadron of 54 vessels under Gen. Leclerc, the husband of Pauline, Napoleon's sister. The expedition failed to conquer the island by force, but the French general secured the sur-



Courtesy British Information Services, N. Y.

TOWER OF LONDON

render of Toussaint by promising that the natives would not be re-enslaved and that no one would be punished for past political offenses. However, the French subsequently seized and carried him to France as a prisoner, and he was committed without trial to the dungeon of the Castle of Joux, near Besançon. He died from neglect after 10 months of prison life. His name has been made famous in literature by Wordsworth and Whittier.

Tower (*tou'ēr*), in architecture, either a separate building of simple and compact form, which may be cylindrical or rectangular, or part of a bigger structure (*i.e.*, church, fortress, or castle). In ancient times, individual towers were constructed for the purpose of defense. They were also used as living quarters for kings or priests, and sometimes as places of worship. See *Babel*, *Tower of*. The lighthouse of Alexandria, one of the seven wonders of the world, was built in the form of a tower. Castles and fortresses, surrounded by walls, with towers at intervals, were used in the Middle Ages. From the time of early Christianity, churches had towers. In Italy, they were separate structures known as *campaniles* (*q.v.*), and in central and northern Europe, they were connected with the church buildings. Frequently they became the objects of artistic elaboration. From the Mohammedan towers (see *Minaret*) which stood beside the mosques (*q.v.*), the believers were called to prayer. In modern times, architecture employs the tower to crown a building as, for example, on the Empire State Bldg. in New York.

Tower, CHARLEMAGNE, diplomat and capitalist, born in Philadelphia, Pa., Apr. 17, 1848; died Feb. 24, 1923. He studied at Harvard Univ., and subsequently became interested in railroading and mining. From 1882-87 he was president of the Duluth & Iron Range R.R., and became a leader in several corporations. He was minister to Austria-Hungary in 1897-99 and then ambassador to Russia. He was also ambassador to Germany from 1902-08. Besides contributing to periodicals, he published "Catalogue of a Collection of American Colonial Laws" and "Marquis de la Fayette in the American Revolution."

Tower of London (*tou'ēr of lūn'dūn*), an ancient structure outside the eastern wall of the city of London, on the northern bank of the Thames. It was begun by Bishop Gundulf under the direction of William the Conqueror in 1078, but remained unfinished for more than 30 years, though various additions and changes have been made since at different times. The buildings occupy 13 acres, surrounded by a wall with massive towers, and are inclosed by a moat or ditch. In the central part is a massive white tower, the oldest of the structures, and surrounding it are the barracks, chapel, and several other buildings. The Chapel of St. John is a fine specimen of Norman architecture. The tower was used as a fortress by the first two Norman kings, and Henry I made it a state prison. It was enlarged from time to time for prison purposes, being used largely for the confinement of political offenders, but also as a royal palace and as a

fortress of defense. Many acts of cruelty were committed there, notably the murder of the two young sons of Edward IV, whose lives were taken for political purposes in the so-called Bloody Tower. The Tower of London is equipped with a small military garrison.

Town Meeting (*toun mēt'ing*), a form of local government, generally found in rural townships, established early in the history of the New England states, and remaining peculiar to that region. In the wider sense, town meetings, whose development can be traced in England, have survived in various parts of Europe, especially in Switzerland, but are best known as an American phenomenon.

The New England town meeting, held once a year, assembles the voters of each town for the purpose of electing or appointing officers, including the board of selectmen, from whom a moderator or presiding officer is chosen; the constable, or chief local law officer; the tax assessor; the road commissioner; the school board; and other functionaries. Appropriations are passed, taxes levied, and local legislative measures under consideration freely debated from the floor. Observers have characterized the town meeting as "democracy in action."

Townsend Plan (*toun'zənd plān*), a plan of social security sponsored by Dr. F.E. Townsend, of Long Beach, Cal., which proposed that all persons over 60 years of age should receive an old age pension of \$200 per month on the condition that they engage in no further activity for profit. The Townsends claimed that these pensions, funds for which were to be raised by a tax on all business and other transactions, would ultimately eliminate unemployment, depressions, etc., and raise the standard of living throughout the country. It was an issue in many Congressional discussions in 1936, and attracted a following of about 1,000,000 members organized in 3,000 Townsend Clubs. The plan, though surviving among small bands of zealots, has fallen now into general desuetude.

Townshend (*toun'zənd*), CHARLES, statesman, born in England, Aug. 29, 1725; died Sept. 4, 1767. In 1747 he entered the House of Commons where he introduced the Townshend Acts (*q.v.*). He held many high offices in various governments but owing to his frequent changes in turning to different political factions, he was known as the *Weathercock*.

Townshend Acts (*toun'zənd ākts*), legislation advocated by Charles Townshend (*q.v.*), then chancellor of the exchequer in England, and passed in 1767, after the repeal of the Stamp Act (*q.v.*). The Townshend Acts, later one of the causes of the American Revolution, enraged the American colonists by levying import duties on glass, paper, and other articles; the revenue was

to be used for remuneration of Colonial officials.

Toxicology (*tōk-sī-kōl'ō-jy*), the science that treats of the nature and properties of poisons, including their effects and antidotes, and embraces the legal questions connected with poisoning. Any substance which exercises chemical or vital effects upon the body which are injurious to health or life is termed a *poison*. The term *vital effects* refers to the influences of poison that are probably due to chemical action, but the means available at present do not enable us to understand them clearly. The effect of a poisonous substance may be local or general, but the quantity is a determining factor, since small doses may be taken without injury to the system. Entrance into the body may take place in a variety of ways, in addition to the more usual way of passage through the mucous membrane of the stomach, after swallowing. These include entrance through open wounds, by subcutaneous inoculation, and through scratches or openings in the skin. Sometimes the system is entered by volatile poisons being inspired with the air. Poisonous substances, to act effectually, must be in the liquid or gaseous state. See also *First Aid; Occupational Diseases; Pharmacy; Poison*.

Toxin (*tōk'sin*), a poisonous substance formed as a secretion product of vegetable and animal organisms. Toxins are distinguished from inorganic poisons, such as alkaloids, by their property of inducing the formation of antitoxin when introduced into a suitable animal and, in most cases, by an incubation period before symptoms of poisoning appear. Lockjaw and diphtheria, for instance, are bacterial diseases and are due to poisoning by toxins.

Toynbee (*toin'bē*), ARNOLD, historian, born Aug. 23, 1852, in London, England; died Mar. 9, 1883, in Wimbledon, England. He was educated at Oxford Univ., where his interest in the working classes caused him to specialize in economics and economic history. After his graduation from Balliol Coll., he lectured in the college until his untimely death. His single book, "The Industrial Revolution" (published posthumously, 1884), was largely composed of his lectures. Toynbee was chiefly important as a teacher, since he did not live long enough to develop an integrated economic theory of his own. He opposed the doctrine of *laissez-faire* on the part of management, and believed in organization by the workers to achieve a higher standard of living. He maintained that the state must provide free education, regulate to some extent conditions of labor, and to provide some sort of insurance against illness and old age. After Toynbee's death, Toynbee Hall in the East End of London was established in his honor. This institution, a settlement house where university students went to live and to help the workers in the neigh-

borhood, became the model for other institutions of the same kind both in Britain and the U.S.

Toynbee, ARNOLD JOSEPH, historian, born in London in 1889, nephew of Arnold Toynbee (*q.v.*). He studied humanities at Balliol Coll., Oxford, and later at the American School of Classical Studies at Athens. During World War I he worked for the English Foreign Office and became adviser to the British delegation at the Versailles Peace Conference, a function which he repeated at the Paris Conference of Foreign Ministers in 1946. Between the two World Wars he traveled widely to Asia Minor, India, Japan, Russia, and the U.S. In 1947 he made a lecture tour of the U.S. His main work, "A Study of History," which he began about 1922, aroused extraordinary interest among historians and educated laymen alike as soon as the first three volumes appeared in 1934. The second three volumes were published in 1940, and the final four volumes, in 1954. A two-volume abridgment, edited by historian I. C. Somervell, was completed in 1957.

Toynbee's importance as historian lies in his universal outlook based upon a tremendous knowledge in many fields and on a definite concept of the basic meaning of history. In contrast to Oswald Spengler and Karl Marx (*qq.v.*) and some other philosophers of history, Toynbee does not twist events in favor of his concept but readily admits facts not corresponding to his theory. Like Spengler, whom he excels in the breadth of his knowledge, he sees the development of historical happenings in terms of whole civilizations, and not in terms of nations. He counts as civilizations 19 to 21 individual developments. Today he distinguishes five such civilizations still in existence; they are the Western civilization (our own), the Russian, the Indian (Hindu), the Far Eastern, and the Islamic. The development of these civilizations is, in Toynbee's opinion (contrary to the concept of Spengler), not organically doomed but it depends on the reactions of these civilizations towards the "challenges" to which they are exposed. Those "challenges" throughout history have been either unfavorable climatic conditions, rough soil, or the threat of a more powerful civilization, or psychological indolence or freezing into passive behaviors. Our own civilization is likely, through materialism and mechanization, to slip into a static stage, although not necessarily. According to Toynbee, in many civilizations a Saviour appears; our Christian salvation, however, has now been threatened since the time of the Reformation in the 16th century on through the continuous growth of science and overvaluation of reason. *Homo occidentalis* (Western man) and his society must respond to challenges which are not material but spiritual. If we overcome the threat



Courtesy Oxford University Press, N. Y.

ARNOLD J. TOYNBEE

of mechanized and standardized matter, society—which actually is nothing but the relations of men among themselves—will survive. From the Eskimo to the Inca, from the Babylonian to the ancient Greek, from the Arabian to the Hindu—Toynbee organizes and interprets historical developments corresponding to these pivotal ideas.

His later works include "Civilization on Trial" (1948), "War and Civilization" (1950), and "An Historian's Approach to Religion" (1956).

Tracery (*trās'ēr-y*), in architecture, the ornamental pattern work composed of wooden or stone bars or ribs, as especially employed in the heads of windows, over portals, and in galleries in the Gothic period. The richness of the pattern increased with the development of the Gothic style; the latest phase, particularly as found in English Gothic, is called *flamboyant*. When work of this character is applied to ceilings, panelings, or on pieces of furniture, it represents a pattern carved on a solid surface in the nature of bas-relief. In the 15th century, the French, working primarily with the flamboyant style, developed the highly intricate windows and ornamentation typified by French cathedrals of this time.

Tracheotomy (*trā-kē-ōt'ō-my*), a surgical operation by which the trachea is opened. It is sometimes necessary in certain diseases, such as affect the larynx, or upper portion of the air passages. They include croup, quinsy, diphtheria, and acute laryngitis, and the purpose is to admit air into the lungs to prevent suffocation. Sometimes this operation is resorted to when a foreign body has become so fixed in the air passages as to obstruct completely the transmission of air through the trachea, or when the throat has been cut. The operation does not contribute toward curing the disease or relieving an obstruction, but merely furnishes a means of enabling the patient to breathe through the artificial opening thus provided. An incision is first made in the median line of the throat, either

below or above the thyroid gland, and the muscles and vessels are pushed aside until the trachea is exposed. A vertical incision is made in the trachea as soon as the bleeding has ceased, and a silver canula is inserted, which sometimes requires the removal of a part of one or more of the rings. The canula is removed when the natural respiration has been restored.

Trachoma (*trà-kō'mà*), also called *chronic granular conjunctivitis*, or *granulated eyelids*, is a chronic contagious inflammatory disease of the conjunctiva (lining of the eyelids). The cause is thought to be a virus. Trachoma is very common in the Middle East and many parts of the tropics and is also seen in the Midwestern U.S. The condition develops slowly with thickening and granular inflammation of the conjunctiva. A panus or veil-like opacity may develop over the cornea of the eye. Shrinkage of the lid and eyeball with ulceration and scar formation may occur, with frequent partial or total blindness resulting. Treatment is difficult, requiring both careful medical and surgical methods.

Trachyte (*tră'kīt*), an igneous rock, so named from the roughness of its surface. Rocks of this class are composed chiefly of silica, alumina, magnesia, and oxide of sodium. The colors are usually light but in some cases are shaded with grayish and darker markings. When feldspar, augite, and hornblende predominate, the rock is classed with varieties of trap, such as basalt and greenstone.

Track and Field. See *Athletics*.

Tract (*trăkt*), a brief treatise on any theme of interest, especially one that treats a religious subject. A tract differs from a book mainly in that it is a short treatise only; it resembles a pamphlet in folding and external appearance. A very famous series of tracts (in England, 1833-41) was associated with the Oxford Movement (*q.v.*). See also *Newman, John Henry*.

Tractarianism (*trăk-târ'i-an-iz'm*). See *Oxford Movement*.

Tractor (*trăk'tēr*), a self-powered vehicle designed specifically for moving loads or for drawing and simultaneously operating farm machinery. Tractors vary in size from the multiton "crawler" or track-laying vehicles used for earth-moving work (*e.g.*, the bulldozer, *q.v.*) to machines small enough to cultivate a backyard garden or push a household snowplow.

The first tractors (also called *traction engines*), *ca.* 1870-1910, were locomotivelike steam engines, with horizontal high-pressure boilers and large rear wheels with broad metal tires. These were used for moving and operating machinery, *e.g.*, a threshing machine, or a combine (*qq.v.*). The modern machine, known as the "farm tractor" or "all-purpose tractor," consists of a powerful gasoline or diesel engine mounted on a short but

high chassis, usually with closely spaced front wheels for easy steering and large rear wheels, with cleated rubber tires, for traction. All have drawbars for pulling equipment, and many have "power takeoffs" by which the engine may be made to operate other mobile or stationary equipment (*e.g.*, combines, generators, post-hole diggers). A variant is the crawler type, which moves on a series of metal plates revolving chain-fashion around a series of power wheels and guide wheels on each side; this type, from which the military tank and other track-laying vehicles have been developed, is largely restricted to industrial and construction uses.

Early internal-combustion tractors first appeared in the 1890's but did not become widespread in use until the development of the cheaper and more maneuverable all-purpose tractor, *ca.* 1918. The steam tractor called for a licensed steam engineer; it is now not uncommon to see farm tractors operated by women and preadolescent children. Farming in the U.S., except on the smallest and hilliest farms, is now largely motorized. The U.S. and Russia are the two largest producers and users of tractors, although other nations, as rapidly as economic conditions permit, are also turning increasingly to the farm tractor. See also *Harvesting Machinery*.

Tracy (*tră'sī*), BENJAMIN FRANKLIN, lawyer and politician, born in Owego, N.Y., April 26, 1830; died in New York City, Aug. 6, 1915. After studying law, he practiced in Tioga County, New York, where he became district attorney, and in 1862 served in the state legislature. He commanded a regiment of Union volunteers at the Civil War battles of the Wilderness and Spottsylvania and was brevetted brigadier general. He later practiced law in New York City, was U.S. district attorney (1866-73), judge of the New York supreme court (1881-82), and Secretary of the Navy under President Benjamin Harrison (1889-93). Tracy defended Henry Ward Beecher (*q.v.*) in the famous Beecher-Tilton case (1875).

Tracy, SPENCER, actor, born in Milwaukee, Wis., April 5, 1900. His first stage roles were in "R.U.R." (1922) and "A Royal Fandango," with Ethel Barrymore (1923). He began his motion-picture career in 1930. His principal films include "Dr. Jekyll and Mr. Hyde" (1941), "Tortilla Flat" (1942), "State of the Union" (1948), and "Desk Set" (1957). The Acad. of Motion Picture Arts and Sciences named him the best actor of 1937 for his performance in "Captains Courageous" and again in 1938 for "Boys Town." In 1945 he returned to Broadway to play the leading role in Robert E. Sherwood's "The Rugged Path."

Trade-mark (*träd'märk*), a distinctive word, emblem, symbol or device, or any combination of these, adopted and used to distinguish the goods of a particular manufacturer or distributor from

like goods of others. The trade-mark symbol assures the public that the product is a genuine article of the owner of the trade-mark, and it prevents the substitution of articles made by other producers. Most countries register trade-marks at a nominal fee. In the U.S., Federal registration of trade-marks is under the jurisdiction of the Commissioner of Patents, whose authority stems from an Act of July 5, 1946, which amended and codified the trade-mark laws. See also *Copyright; Patent*.

Trade Policy (*trād pōl'i-sy*), in economics, a term designating the political measures which define the attitude of a given nation toward commerce and trading. There are two main trends possible: free trade (*q.v.*) or a tariff (*q.v.*) system. The first opens national borders to the products of other countries, while the latter closes the borders and encourages home production of goods by setting up prohibitive import duties. See *Manchester School; Mercantilism; Political Economy; Reciprocity*.

Tradescantia (*trād-ēs-kān'shī-ā*), a large genus of perennial herbs, of which some species are native to the U.S. and some are common in the tropics. They have large, elongate leaves and bear white or violet flowers.

Trade Union (*trād ūn'yūn*), a continuous organization of workers formed for the purpose of securing economic, social, and political improvements for its members. From the organization, in 1792, of the first trade union in the U.S. until 1815, unions were mainly concerned with the first of these goals—the economic goal. They tried to have their wages increased, to secure a closed shop, and to shorten their working hours. From 1815 to 1835, the emphasis shifted to political and social reforms. Many of the handful of unions then in existence cooperated with the Workingmen's parties in trying to achieve free public education, improvements in the banking system, and the ending of imprisonment for debt.

These early unions worked under a severe handicap. Not only were they just starting, but the courts and the government did not view them with sympathy. The courts ruled (*e.g.*, in the Philadelphia Cordwainers Case in 1806) that the trade union as an association of workers was a conspiracy in restraint of trade and consequently illegal. Despite this unfavorable ruling, unions continued to form, and in 1842 the Massachusetts supreme court (in the *Commonwealth vs. Hunt* case) ruled that unions were legal as long as they strove for legal ends.

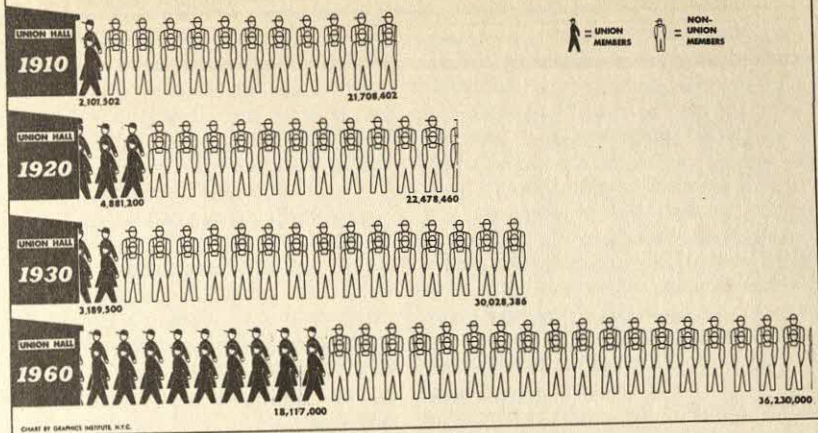
At about the time of this decision, the impact of the Industrial Revolution, which brought basic changes to the American economy, began to be felt more and more throughout the U.S. A national market developed during the latter half of the 19th century, and, consequently, more local

trade unions began to join together into national trade unions like the Typographers and the Cigar-makers. There were many reasons for this development. A New York cigar maker, for example, had to make sure that a Chicago cigar maker received as much pay as he, or Chicago cigars would sell for less and drive him out of a job. Or, a Philadelphia union member might want to move to Cleveland; a local union would lose him as a member, but a national union would keep him as a member and provide him with entrance into his industry in the new locality. In addition, these national unions had control over locals and could provide them with financial assistance. As a result, national unions did not disappear in the face of a depression as had the small local unions; and many of these national unions have remained permanently on the American scene.

In 1869 a new national union appeared on the scene—the Knights of Labor. Unlike the other unions, which were composed solely of members who worked at one skill or in one industry, anyone could join the new organization with only a few exceptions, like lawyers and saloon keepers. Its main concern was with reform—land reform, bank reform, and co-operatives. It opposed strikes, yet successful strikes in 1886 skyrocketed its membership to an estimated high of about 700,000 members. Shortly thereafter, a series of unsuccessful strikes and charges of radicalism helped bring about a rapid decline in its membership. Another major cause of its decline and eventual disappearance was the formation of the American Federation of Labor (*q.v.*) in 1886 (sometimes dated from the organization of the Federation of Organized Trades and Labor Unions in 1881).

The A.F.L. was an association of national unions. It had limited powers over its members because the national unions were considered autonomous. Still, it was able to do the following things: It helped organize new workers, strove to settle struggles among unions for jurisdiction over different groups of workers, and helped raise money for needy unions. And as a spokesman for all the unions, it made its voice heard on political issues. It kept its political demands at a minimum, however, because the A.F.L.'s main interest was in economic gains. Led by Samuel Gompers (*q.v.*), the A.F.L. argued that workers could and would improve their status through trade union action, like collective bargaining, and not through the ballot box. Moreover, unlike many European trade unions, it opposed the nationalization of industry. William Green (*q.v.*), who became president of the A.F.L. upon Gompers' death in 1924, followed the same principles.

After the collapse of the Knights of Labor, the A.F.L. had no real competition until the 1930's. Earlier, the Industrial Workers of the World and



the Communist Trade Union Unity League had attempted to attract workers away from the A.F.L. but had failed. (The I.W.W. currently numbers about 2,500, while the league no longer exists.) The depression of 1929-33 and the recovery which followed brought to the fore a real competitor to the A.F.L.—the Congress of Industrial Organizations (C.I.O.).

During the generally prosperous period between World War I and the 1929 depression, a strong management program against trade unions helped cause union membership to decline. The depression caused a further drastic fall in membership. With the election of Franklin D. Roosevelt to the Presidency in 1932, an administration sympathetic to the labor movement came into office, and, as a result, union membership began to zoom upwards. The passage of the National Industrial Recovery Act in 1933 and the National Labor Relations Act (Wagner Act) in 1935 also helped unions. Certain union officials, e.g., John L. Lewis and Sidney Hillman (q.v.), however, believed that the A.F.L. was not organizing workers quickly enough. They objected to the failure to organize unskilled workers and mass production workers and argued that an industry like the automotive industry had to be organized on an industrial basis, whereby one union would take in all the workers in the industry no matter what their skill. The A.F.L. had generally followed the craft union approach, in which each union accepted members in only one skill regardless of the industry in which they worked. Dissatisfied with the craft principle, John L. Lewis and other union officials organized the Committee on Industrial Organizations in 1935, which became the Congress of Industrial Organizations in 1938. Lewis was the first president, and upon his resignation in 1940 Philip Murray (q.v.) became president.

The 1930's and 1940's were a period of tremendous growth in trade unions. The organization of heretofore unorganized industries, e.g. the automotive and steel industries, the sympathetic

attitude of the Roosevelt administration and of the courts, and, finally, World War II and the resulting demands on production caused union membership to increase from nearly 3,000,000 in 1933 to about 15,500,000 in 1947.

Union membership has increased gradually since then; but a recent decline in the rate of growth has been blamed by union officials on the passage of the Taft-Hartley Act in 1947 (see *National Labor Relations Act*) and since 1953 on a Federal administration allegedly less sympathetic to labor. The estimated trade union membership in 1957 was 18,000,000, including Canadians.

In December 1955, the A.F.L. and the C.I.O. merged to form the American Federation of Labor-Congress of Industrial Organizations. In addition to the more than 130 national unions which are affiliated with the A.F.L.-C.I.O., there are many independent unions. These include such large organizations as the United Mine Workers of America (q.v.) and the Railroad Brotherhoods. Other independent unions are those expelled from the A.F.L. or C.I.O. because of charges that they were Communist- or racketeer-dominated. A large number of independent unions have members in only one plant. The membership in independent unions has been estimated at 2,000,000.

American unions have on occasion affiliated themselves with international federations of labor; e.g., in 1909 the A.F.L. joined the International Federation of Trade Unions, which had been established in 1903 as the International Secretariat of National Trade Union Centers. In 1949 U.S., British, and Dutch unions established the International Confederation of Free Trade Unions.

AIMS AND TACTICS: American unions have generally refrained from specific definitions of objectives. They talk about a "fair day's pay for a fair day's work," and their activities seem centered about increasing wages, decreasing hours of work, improving working conditions, strengthening job security. To this end, unions have

sought to establish seniority systems, paid vacations and holidays, and various devices to circumscribe the employer's power to make unilateral decisions affecting his employees. Grievance and voluntary arbitration programs have been installed, and union rights of visitation established.

It is an aim of unions to bargain collectively on behalf of their members with management and to obtain an agreement which will be reduced to writing. The National Labor Relations Act makes it an unfair labor practice for employers to refuse to bargain with the duly chosen representatives of their employees.

A major controversial issue at the present time is the union shop¹. American unions have long fought for the principle that every employee in the bargaining unit should belong to the union. They have argued: (1) that all workers should share in paying for the benefits obtained by the union, since benefits extend to union and non-union workers alike; (2) the protection of workers against employer hostility requires that the employer should not be able to play off his unorganized workers against the organized. On the other hand, it has been argued that the union shop limits the fundamental freedom to work by attaching a condition to working which many find undesirable. Within recent years, 18 states have passed laws prohibiting the union shop.

As coercive tactics, unions may engage in strikes, boycotts, and picketing. These are sometimes defensive weapons, however. In some industries, unions may secure concessions from employers by permitting them to use the union label.

UNIONS AND POLITICS: Unions have also attempted to achieve some of their goals through political action, either by trying to have people sympathetic to their goals elected to office or by lobbying favorable legislation through the U.S. Congress or through state and city legislatures.

BENEFIT PROGRAMS: In addition to their collective bargaining activities, many unions engage in a large variety of activities designed to help their members. They have old-age benefits, death benefits, accident and sickness funds, unemployment benefits, housing projects, credit unions, schools, vacation resorts, athletic and social programs, and newspapers and magazines. See also *American Federation of Labor and Congress of Industrial Organizations*; *Labor* and related articles; *World Federation of Trade Unions*.

Trade Wind (*trād wīnd*). See *Wind*.

Trading Company (*trād'ing kŭm'pā-nŷ*), the name applied to any one of several great associations promoted in Europe for the promotion of trade and to extend the colonial interests. Such

organizations were promoted extensively in the 16th and 17th centuries. Those most noted in America are the Hudson's Bay Co., the Virginia Co., and the Massachusetts Bay Co., and through their operations were established the leading British colonies in America. The British East India Co. and the Dutch East India Co. were two powerful organizations in the exploitation of colonies in Asia. The business was managed by a board of directors, who usually chose their own officers, and the members held interests much the same as is the case in a joint-stock company. In most cases these companies were authorized by the government as a means of founding colonies and incidentally to promote trade and develop resources.

Trafalgar (*trā-fāl'gār*), a cape on the southern coast of Spain, projecting into the Atlantic, at the entrance to the Strait of Gibraltar. It is memorable as the scene of a great naval victory by the British fleet under Nelson (*q.v.*) over the allied fleet of Spain and France under Villeneuve, on Oct. 21, 1805. As reported in most accounts, the allied fleet had 38 vessels and the British had 31; 20 of the former were captured in the engagement. However, Adm. Nelson was fatally wounded in the encounter.

Traffic Regulations (*trāf'ik rĕg-ŭ-lā'shŭnz*), rules governing the movement of wheeled vehicles on public roads, primarily motor vehicles. Although traffic regulations vary between states and cities, the following are common general principles:

Every operator of a motor vehicle must obtain a license to drive that vehicle unless it is a government-owned vehicle or is being driven on his own property.

Always drive on the right. In three-lane highways the center lane is used only for passing. In four-lane highways, on which the traffic is divided, the right lane of each pair is used for slower traffic and the left lane is used for fast traffic.

Always observe lines dividing a highway. A broken line defines traffic lanes; it may be crossed at any time that does not interfere with traffic. A solid line may be crossed only when conditions are favorable, and it is necessary that extreme caution be exercised. A solid line and a broken line side by side indicate that vehicles on the side of the solid line may not cross that line at all, although vehicles on the side of the broken line may cross when using extreme caution. A double solid line means that no crossing from either side is permitted at any time.

Always give a hand signal before stopping or turning your car. When merely stopping your car extend the left palm out straight; when making a left turn point to the left with the forefinger rather than with the whole hand. When turning to the right move your hand in a circular motion indicating to the driver behind you that he should pass.

Never pass on the right.

Never follow another car too closely.

Always observe all traffic signals and signs.

Always report any accident to a police officer or the nearest motor vehicle office.

Never drive while under the influence of liquor.

¹In a union shop, the employer may hire union members or nonunion men, but he agrees that all nonunion personnel must join the union within a stated period after employment.

Tragacanth (*trăg'ă-kănth*), the name of several species of shrubs found in Asia Minor, belonging to the pulse family. These plants yield the tragacanth of the market, a gum valuable in medicine and for calico printing. It is a hard substance, has a slight taste and no smell, and is difficult to pulverize. When placed in water, it absorbs the liquid and forms an adhesive paste. Though similar to gum arabic, it differs from it in a few chemical properties. As a medicine it is used for treating coughs and catarrhs.

Tragedy (*trăj'e-dy*). See *Drama*.

Tragopan (*trăg'ô-păn*), or HORNED PHEASANT, a species of the crested pheasants, found chiefly in China and India. The bill resembles that of the common fowl, the tail is rounded, and the plumage is variously colored. Instead of a comb, the male has a crest of soft feathers, has two hornlike appendages above the eyes, and is wattled in front on the throat. The appendages are protractile and retractile at will. In their habits they are generally solitary and dwell in the recesses of their native forests. The food consists of grains, roots, and insects. Five species of these birds have been described.

Trailer (*trăl'ēr*), a wheeled vehicle drawn by another having motive power (ordinarily on a road, as distinct from railway cars), as a truck or automobile. In hauling, trucks often draw attached trailers to carry additional goods. In recent years caravanlike trailers, fitted out with housekeeping facilities, have come to be used by private-car owners as traveling homes. At first used only for travel and vacations, trailers and organized trailer camps developed into actual homes and communities, complete with kitchen and sleeping facilities, etc. If the dwellers of these "homes on wheels" must move to another locality because of jobs or other reasons, the trailer is reattached to the automobile and drawn intact along on the highway.

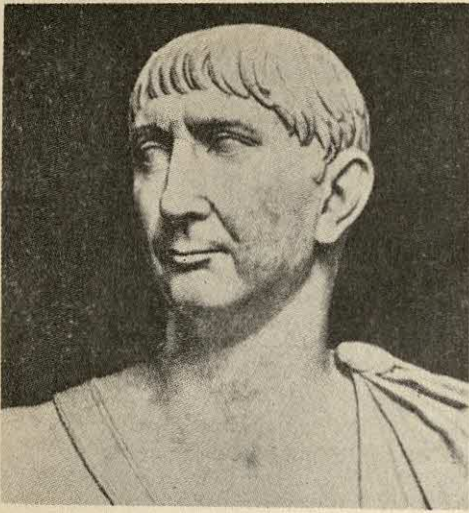
Trailing Arbutus (*trăl'ing är-büt'us*), an evergreen trailing plant, sometimes called *ground laurel* and *mayflower*. A number of species have been enumerated, most of which are American. The flowers are white or pinkish, growing usually in clusters, and are noted for their perfume. These plants are admired for their beauty and the fine-scented flowers, but are difficult to transplant. The dried leaves of species called the *red bearberry* are used as an astringent and tonic medicine. They possess medicinal value in treating chronic affections of the bladder.

Train (*trăn*), ARTHUR, author, born in Boston, Mass., Sept. 6, 1875; died Dec. 22, 1945. The son of an attorney general of Massachusetts, Train was graduated from the Harvard Law School in 1899 and became a member of the Massachusetts and New York bars. He was assistant district attorney for New York County, 1901-08 and 1914-

15. He also practiced law in New York City, 1916-23. Among Train's best-known works are: "McAllister and His Double" (1905); "Mortmain" (1909); "Tutt and Mr. Tutt" (1920); "By Advice of Counsel" (1921); "Tut, Tut, Mr. Tutt!" (1923); "The Needle's Eye" (1924); "Page Mr. Tutt" (1926); "When Tutt Meets Tutt" (1927); a commentary on the financial crash, "Paper Profits" (1930); a collection of Tutt stories, "The Adventures of Ephraim Tutt, Attorney and Counselor at Law" (1930); an informal history of American customs and manners, "Puritan's Progress" (1931); "Mr. Tutt Comes Home" (1941); "Yankee Lawyer, the Autobiography of Ephraim Tutt" (1943). Immensely popular, especially with readers of the *Saturday Evening Post*, the Tutt stories were distinguished for narrative skill, for their lovable characters, and for their authentic legal background.

Train, GEORGE FRANCIS, financier and author, born in Boston, Mass., Mar. 24, 1829; died in New York City, Jan. 18, 1904. Placed in charge of the Liverpool branch of an American business house, he was admitted to a partnership in 1853, after three years' experience. When another branch was opened in Melbourne, he was placed in charge of that office, at the same time operating a sailing-ship service between Boston and Australia. In 1858, he interested English investors in the building of the Atlantic & Great Western Ry. In 1872, he became an unsuccessful independent candidate for the Presidency of the U.S. His later years were devoted solely to writing and public speaking, addressing solely children's groups. Leaving behind a \$30,000,000 estate, he died in a second-class New York City hotel. Among his published works are: "Young America on Slavery," "Young America Abroad," "Young America on Wall Street," and "My Life in Many States and in Foreign Lands."

Trajan (*tră'jan*), MARCUS ULPUS, Emperor of Rome, born near Seville, Spain, Sept. 18, 52 A.D.; died in Selinus in July 117. He was descended from a family of Roman origin and showed early military skill in the campaigns against the Parthians and the Germans on the Rhine in the reigns of Titus and Domitian. His distinguished services caused his appointment to the consulship in 91, and Nerva created him Caesar in 97. On the death of Nerva, in 98, Trajan returned from Germany and ascended the throne, making large gifts to the Roman citizens and soldiers. He concluded peace with the German tribes, introduced reforms in the public service, and in 101 led a large army from Rome against the Dacians, making their country a Roman province in 105. While on this foreign campaign, in 103, he directed an epistle to Pliny, governor of Bithynia and Pontus, in which he instructed that official not to heed anonymous charges against Christians.



TRAJAN

Trajan entered upon an extensive campaign to the East in 106, annexing Armenia, Parthia, Arabia, Mesopotamia, and other regions. He crossed from the Caspian Sea to the Indian Ocean and was the first Roman to explore the Persian Gulf. The government of Trajan is noted as one of the most vigorous and efficient of Rome. He adorned Rome with splendid buildings and bridges, built canals and highways, and founded new cities. Trajan's column, still to be seen at Rome (*q.v.*), was built to commemorate his victory over the Germans. Trajan's wall, extending from the Black Sea to the Danube, was also constructed during his reign. The Roman Empire reached its greatest extent under Trajan, and it was said of him that he never permitted a Roman army to be defeated. He founded several libraries at Rome, the most celebrated of which was the *Ulpia Bibliotheca*. Hadrian succeeded him as emperor.

Trajan, ARCH OF, a commemorative arch erected in Benevento, Italy, in A.D. 114. It is of white marble, 50 ft. high; the archway is 27 ft. high. In low relief, events from the life of the emperor are recorded.

Trajan's Column (*trā'janz kōl'ūm*). See *Rome*.

Trajan's Wall (*trā'janz wāl*). See *Trajan*.

Trajectory of Projectile (*trā-jēk'tō-rī of prō-jēk'tīl*), the path followed by any object initially moving at an angle to the horizontal. Bullets and artillery shells are among the objects following a curved trajectory. Because of the gravitational acceleration the projectile follows a parabolic path in vacuum. In air the path is deformed and flattened at the end due to resistance of the air. The distance from the bullet's point of departure to the point at which it returns to earth is called the *range*.

Tramway (*trām'wā*), a primitive kind of railway, today used in construction work. The grad-

ing is not as uniform as for electric and other railways; the rails are made of wooden stringers laid upon ties, and the upper part is protected by straps of iron. Tramways preceded steam and street railways, and the first were completed in England to transport stone from quarries and coal from mines. Tramway is also the British term for street railway (*q.v.*).

Trance (*trāns*), a state resembling sleep, in which the power of volition is suspended and the vital organs are almost inactive. The person may be partly or wholly dazed as in a stupor; the sleeplike state of a trance may also be compared with a state of deep hypnosis. In certain instances it may be self-induced as in religious exaltation; in other cases a trance may be the symptom of a nervous ailment, such as hysteria.

See also *Spiritism*.

Transalpine (*trāns-āl'pīn*), a general geographical term for that region lying across the Alps (*q.v.*) from Italy.

Transcaucasia (*trāns-kō-kā'shī-ā*), that region lying across the Caspian Sea from the Caucasus Mts., now applied to Turkmenistan (*q.v.*), or the Turkmen Soviet Socialist Republic.

Transcendentalism (*trān-sēn-dēn'tāl-iz'm*), a term in philosophy characterizing a trend of thinking which is concentrated on ideas beyond actual experience. It therefore supposes that actual and ultimate reality can never be either recognized or proved by experience and is thus "non-empirical" and transcendental. Out of this general concept special meanings have developed, such as the following:

In *mathematics*, since the time of G. W. Leibnitz (*q.v.*), it has meant all operations which go beyond normal algebra.

In *philosophy*, it generally means the acknowledgment of a superior being not contained within reality. In this sense, everything that goes beyond the nature of the scrutinizing being is transcendental. The fact that this non-recognizable, non-spatial, non-pictorial, incorporeal, suprasensuous being or value exists, means the acknowledgment of two separate spheres, *i.e.*, a definite dualism (*q.v.*). The problem of whether these two spheres are entirely unconnected or in some way integrated is answered by various idealistic philosophies in different ways. More especially, God is transcendent, since He is beyond imperfection and incomprehensible. Thus, transcendental concepts are the only possible way for our metaphysical and religious knowledge. On the other hand, transcendental qualities are also common to all types of *Being*, like unity, truth, goodness. In the *philosophy of Scholasticism*, it means all phenomena not contained in the Aristotelian categories.

In the *philosophy of Schelling and Kant*

(*qq.v.*), transcendentalism refers to everything concerned with what is outside of our experience. Kant himself called his own philosophy transcendental. He believed that even the forms of our experience, *e.g.*, our concept of space and time, are not given by our experience but by our consciousness, so that even these forms in themselves are transcendental. Thus, the *how* of our experience is definitely transcendental; the *what* of our experience is a delusion (*Transcendentaler Schein*), since our mind can recognize ultimate reality only by experience out of which we try to construct ideas, although we do not actually know anything about them. Logically, these ideas by themselves are transcendental, since human experience can only be had in *a priori* forms of intuition. The thing-in-itself or the object as such cannot be recognized, but something from our experience corresponds to it, in what way we cannot know.

In *American philosophy*, Transcendentalism means a special branch of idealistic philosophy, culminating in a movement which was organized in the Transcendental Club of Boston in 1836 and which flourished in New England. Transcendentalism in the U.S. actually began in the 1820's, through the direct influence of German philosophy, especially the writings of Kant and Schelling, and of German Romanticism in literature. Although organized in Boston, it later found its center in Concord, Mass. Its publication was *The Dial* (1840-44). Its literary stimulation came from Carlyle, Coleridge, and Wordsworth, its social stimulation from contemporary French and English movements. Brook Farm (*q.v.*), started in 1841, represented a typical social experiment of American Transcendentalism. Ralph Waldo Emerson (*q.v.*), called "The Transcendentalist," Henry Thoreau, Bronson Alcott, William H. Channing, and Margaret Fuller (*qq.v.*) were leading representatives of this movement, which rather vaguely opposed middle-class commercialism by a generally idealistic and metaphysical attitude. In spite of its connection with transcendental philosophy, it actually never developed a clearly defined scientific system. The American Transcendentalists agreed in their view that the mind is supreme over matter, but besides this general statement, it would be hard to find any more exact philosophical definitions for the movement.

Transfiguration (*trāns-fig-ū-rā'shūn*), an event in the life of Christ in which He was divinely transformed and appeared to Peter, James, and John, accompanied by Moses and Elias. The event is described in Mark 9:1-8, and Matthew 17:2-8. It was on this occasion that God spoke from within a cloud, acknowledging Christ as His Son, "... in whom I am well pleased."

Tradition has identified Mt. Tabor, in Galilee, as the site of the event. The feast of the event is celebrated on Aug. 6.

Transformer (*trāns-fôr'mēr*), an electrical device for transforming or changing an alternating current (*q.v.*) from one voltage (see *Volt*) to another. It consists of a steel core upon which are wound two or more coils of wire (see *Coil*). Such coils are called primary and secondary; the primary coil receives current from the source of supply, and the secondary coil delivers it to local lines, which supply the various current-consuming devices. Transformers are classified in many ways, according to their construction, use, method of cooling, and method of insulating.

Nearly every home receives its supply of electricity through a transformer. The transformer is commonly mounted on a pole at the point where the wires lead from the main line to the house, or to a group of houses. In large cities, transformers are commonly located under the street or in the basements of buildings. Their function is to reduce the high voltage in the supply circuit (usually 4,200 or 2,300 volts) to the normal-use voltages of 220 or 110. See also *Converter*.

Transfusion of Blood (*trāns-fū'zhūn of blūd*), the injection of blood from some other person into a patient's body as a means of treating disease or invigorating the system. See *Blood Transfusion*.

Transistor (*trān-zis'tēr*), from *transformer* and *resistor*, a device (*ca.* 1/4 in. in diameter and less than 1/2 in. in length) which performs many of the functions of the electron tube (see *Electronics*). The most frequently used type of transistor consists of a thin wafer of pure single-crystal germanium, on both sides of which tiny specks of pure indium are deposited. When the indium melts, it forms a junction with the germanium. The assembled transistor is hermetically sealed in a metal or plastic housing. When used in a suitable circuit, a transistor has an estimated operating span of from 10 to 80 years. A transistor gives off little heat, and a number may be confined in a small space. It does not require a vacuum for its operation. Germanium and silicon are the heart of present-day transistors, and these elements do not need heat to "urge" electrons into motion. Transistors are used in hearing aids, pocket-sized radio receivers, computers, missiles, telephone equipment, and industrial control devices.

Transit (*trān'sit*), in astronomy, the passage of a body over the meridian of a locality. At the instant of transit, the body is due north or south of the observer. Transits of the brighter stars can be observed, with suitable instruments, to furnish accurate time. Converse-

ly, when the latter is known, the transit of a star determines its right ascension (east-west location on the celestial sphere).

The transit instrument is a small telescope (pivoted on a horizontal axis and free to move in the plane of the meridian), which is used for observing transits of stars. The basic surveying instrument used for measuring angles of elevation and azimuth is also called a transit. See *Theodolite*.

The term transit is further used for the apparent passage of one celestial object over the disk of another. For example, transits of Jupiter's satellites across the disk of that planet are almost daily phenomena. Transits of the planets Mercury and Venus in front of the sun are rare events. About 13 transits of Mercury occur per century, at intervals of from 3 to 13 years. Transits of Venus occur at successive intervals of 8, 105, 8, and 122 years, the latest being on Dec. 6, 1882, and the next occurring on June 8, 2004.

The basic surveying instrument used for measuring angles in three dimensions is also called a transit.

Transjordan (*träns-jór'd'n*), a country of the Near East, since 1946 known officially as the Hashemite Kingdom of Jordan. It is bounded on the n. by Syria, on the n.e. by Iraq, on the s. by Saudi Arabia, and on the w. by Israel. From Syria in the north, Transjordan stretches south to the Gulf of Aqaba on the Red Sea. Comprising 37,301 sq. m., the country contains two major areas—the area east of the Jordan River (old Jordan) is largely on an arid plateau, while that west of the river (formerly Arab Palestine) is at a lower altitude and far more fertile. The population (1954 official est., ca. 1,500,000), is mostly Arab, of the Sunni Moslem religion, and Arabic speaking. The main cities are the capital, Amman, the old city of Jerusalem (which serves as the administrative center of western Jordan), Es Salt, and the port of Aqaba on the Red Sea. There is little cultivated land in eastern Jordan, but western Jordan yields wheat, barley, and grapes. Industries include tobacco, flour milling, distilling, and the mining of potash in the Dead Sea area.

In Biblical times the territory included in Transjordan was known as Gilead, Edom, and Moab. The land was first conquered by the Amorites, then by the Nabateans (312 B.C.), by the Romans in A.D. 106, by the Arabs in the 7th century, and by the Ottoman Turks in the 16th century. The Turks maintained control until World War I, when Great Britain occupied the area. Thereafter, until 1946, Transjordan was administered by a British high commissioner and ruled by Emir Abdullah (son of King Hussein of the Hejaz). On March 22, 1946, Jordan gained its independence, and Abdullah became king.

In 1945 Jordan joined the Arab League (*q.v.*),

in 1948-49 fought against Israel (*q.v.*), and after the truce settlement annexed Arab Palestine, an area extending from the Jordan River to Jerusalem. Early in 1952, a new constitution was passed, vesting executive power in the king and a cabinet and legislative power in a parliament (consisting of a 20-member appointed senate and a 40-member lower house of elected representatives). King Hussein I succeeded to the throne in May 1952, after the assassination of his grandfather, Abdullah. In 1958 Jordan and Iraq formed the Arab Union (*q.v.*), which was dissolved after a military *coup d'état* in Iraq in July of the same year.

Transmigration (*träns-mī-grā'shūn*), or METEMPSYCHOSIS, a concept that one soul resides successively in different bodies, either human, animal, or inanimate. The belief in transmigration is very old and a part of the faiths of many primitive peoples. In some religions the concept is more developed, usually to include the belief that the condition of the soul (*q.v.*) in reincarnation depends upon the record of behavior that its host has made during its previous existence.

The idea of transmigration appears in modified form in Brahmanism and Buddhism, and it is said that Buddha himself went through 550 incarnations (such as king, slave, elephant, tree) before achieving final perfection (see *Brahma*; *Buddhism*; *Vedanta*). It is doubtful, however, whether transmigration was part of the early Aryan beliefs. In ancient Egypt, transmigration was the reason for the attempt to preserve the body. Transmigration also appeared in ancient Greek philosophy. It was set forth by Pythagoras and was clearly described in the Orphic Mysteries (*q.v.*). Dionysus or Bacchus (*q.v.*) is conceived of as the leader of the migrating souls (see *Persephone*; *Mystery*). Plato (*q.v.*) discussed specifically the form of the appearance of human souls and how certain human types would become wolves or eagles, bees or ants. The Neo-Platonists elaborated on the idea.

Transmigration has also appeared in various Jewish philosophical writings and was especially prominent in the Cabala (*q.v.*). It also played a large part in Manichaeism (*q.v.*); since the latter religious system had been influenced by Gnosticism (*q.v.*), it is believed that some Gnostics held transmigration possible. It has, however, never been accepted by Christian thinkers.

See also *Immortality*; *Theosophy*.

Transmutation (*träns-mū-tā'shūn*), an alteration in the identity of any atom as a result of a physical or chemical process. The ancient alchemists tried to change the base metals into gold without success. Transmutation was finally accomplished by Sir Ernest Rutherford (*q.v.*), an English scientist, by bombarding nitrogen atoms with alpha particles. High-speed

particles, such as neutrons, protons, or alpha particles, are very effective in penetrating atomic nuclei and producing transmutations.

Transportation (*trāns-pōr-tā'shūn*), the industry of carrying persons and goods from one place to another. The means of transportation depend upon the development of trade within a country and are influenced noticeably by the complexity of its economic system. Formerly trade was carried largely by water, at which time internal commerce was necessarily limited. The first steps toward the development of means of inland transportation is found in the construction of canals and highways. The first important systems of highways were developed by the Romans. Modern transportation greatly overshadows that of ancient times, upon both land and sea, and in the air, owing to the application of steam in navigation and the development of railways, electric lines, buses, trucks, and airplanes.

Transportation has greatly added to the comforts of mankind, chiefly through the fact that modern methods permit rapidity and insure a high degree of safety. Improved transportation has increased industry and lessened distances as well as differences between people and countries. Modern steamships are constructed of steel and other durable materials, and their great size and accuracy of movement render them much more secure than the inadequate and wooden vessels of former periods. Besides, the products of different belts of climate and soil may be enjoyed by the people in a condition as favorable as where they were produced. This has given rise to the use of a larger variety of commodities and has brought the products of widely scattered localities to the homes of those who would otherwise be entirely deprived of them. Transportation changes, such as the use of private automobiles, buses, and airplanes, not only affect commerce and interchange of ideas but also bring new modes of living. The tempo of life is increased and with it customs and ideals undergo change. Air transportation especially carries in its wake vast innovations; mail and passenger services, scientific research, technical training, and methods of warfare are some of the phases of life affected by air travel. See *Automobile*; *Aviation*; *Commerce*; *Interstate Commerce*; *Navigation*; *Railroads*; also plates in color in *Volume XI*.

Transubstantiation (*trān-sūb-stān-shī-ā'shūn*), a theological term which signifies the conversion of the substance of bread and wine into the substance of the Body and Blood of Christ. This change is brought about by the act of consecration, and the belief in the change is basic for the followers of the Roman Catholic and Greek Orthodox religions. Transubstantiation represents the very essence of Holy Communion, or the Lord's Supper (*q.v.*), a sacrament which

is second in importance only to baptism. The history of the church shows an evolution in the concept of Transubstantiation from a somewhat literal, material interpretation to a more allegorical idea. Differences of opinion on this concept also existed among the various Protestant reformers. See *Eucharist*.

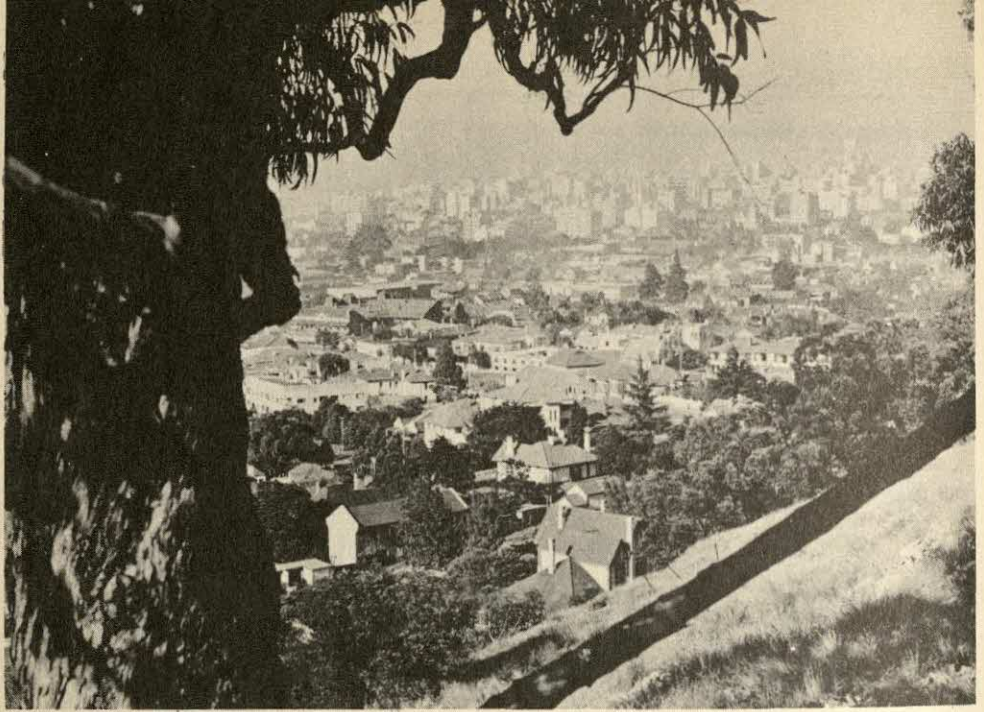
Trans-Uranium Elements (*trāns-ū-rā'nī-ūm ēl'ē-mēnts*). See *Uranium*.

Transvaal (*trāns-vāl'*), a province of the Union of South Africa, lying north of the Vaal River, which separates it from the Orange Free State. It is bounded on the n. by Rhodesia, e. by Portuguese East Africa and Swaziland, s. by Natal and the Orange Free State; and w. by Bechuanaland. It has an area of 110,450 sq. m.

DESCRIPTION. Most of the interior is an elevated plateau ranging from 3,500 to 6,000 ft. above sea level. It is divided into the two regions known as Grass Veld and Bush Veld. The former is a semi-arid tract covered with nutritious grasses. The Bush Veld is well wooded and comprises the valley of the Limpopo River and a narrow strip along the eastern border. In the east central part are ranges of the Drakensberg Mts., which extend north and south through the country and reach their highest summits in Mauch Mt., 8,975 ft. The Limpopo Mts. form the eastern boundary, separating the country from Portuguese East Africa. A range of highlands extends through the country from east to west, known as the Witwatersrand, with a general elevation of 6,000 ft.; these form the watershed between the Vaal and the Limpopo Rivers. Ranges extend from the main ridge both north and south.

The northern boundary is formed by the Limpopo River, which furnishes the main drainage. It receives the inflow from the Olifant River after the latter crosses the eastern border into Portuguese East Africa. A large part of the southern boundary is formed by the Vaal, a tributary of the Orange River. Swaziland is drained mainly by the Maputa, which discharges into Delagoa Bay, an inlet from the Atlantic. The Transvaal is an interior country, having no sea coast, and none of its rivers is navigable. The climate is favorable to Europeans, and in the northern part assumes a subtropical character. July is the coldest month and January is the warmest. The mean temperature is 67°. Frosts occur in winter, but chiefly in the highlands. Rainfall is abundant in the valley of the Limpopo and the eastern section, where it averages 28 in., but it is scant in the western part. The acacia, the eucalyptus, and other trees native to warm climates thrive in the fertile and well-watered parts.

INDUSTRIES. Mining is the principal occupation, and gold, coal, and diamonds are the chief minerals. Barberton and the Witwatersrand have the most productive gold fields, and the total output



Courtesy Union of South Africa Govt. Information Office, N. Y.
VIEW OF JOHANNESBURG, TRANSVAAL

for the province is about 14,000,000 oz. per year. Coal is produced for export to other points in Africa and to Europe. The output of diamonds is large. Other minerals include tin, copper, silver, lead, iron, cobalt, platinum, and asbestos, but these have not been developed extensively.

Agriculture is possible in most parts of the province and there are extensive irrigation settlements. Most of the farms are large. Maize, kaffir corn, wheat, barley, and oats are the principal cereals. Vegetables and fruits are grown successfully. Stock raising is an important industry, for which the climate and the native grasses are highly favorable. Cattle and sheep are raised extensively, and large interests are vested in horses and swine. Tobacco of a good quality yields well.

A large part of the manufacturing is connected with the gold mining industry. Flour mills, brick and tile works, breweries, and foundries are the chief enterprises. Among the general manufactures are malt liquors, brick and tile, cigars and pipe tobacco, clothing, and machinery.

Railroads total nearly 4,000 m. and are connected with those of the Orange Free State. A branch extends from Pretoria east to Lourenço Marques, on Delagoa Bay. Gold, diamonds, livestock, wool, coal, tobacco, and lumber are the principal exports. The imports consist chiefly of textiles, foodstuffs, chemicals, clothing, and machinery. Most of the trade is with Great Britain.

GOVERNMENT. Self-governing since 1906, the Transvaal has an administrator, an executive council, and 55 elected members of a Provincial Council, and sends members to the Union Parliament.

All laws and public documents are printed both in the English and Afrikaans (Dutch) languages.

A free public-school system for whites was established in 1907. Attendance is obligatory for white children between 8 and 15 years. Both English and Afrikaans are taught. High schools are maintained in the towns and cities. The Transvaal Technical Inst., at Pretoria, carries courses in mining, engineering, and commerce. The schools and institutions are nondenominational.

INHABITANTS. The people residing in the Transvaal include many races, both native and European. In 1936, Swaziland had a total population of 156,715, of which 2,740 were whites. The Transvaal in the same year had a population of 3,341,470, which included 820,756 whites. The Europeans are mainly of Dutch and British descent. A large majority of the Christians belong to the Dutch Reformed Church. Other denominations include Anglicans, Roman Catholics, and Jews. Pretoria, in the central part, is the capital. Johannesburg, the center of the Witwatersrand, is the largest city. Other cities include Barberton, Nylstroom, Heidelberg, and Lichtenburg.

HISTORY. The Transvaal country was first settled by Boers in 1845, these sturdy and industrious people leaving Natal in that year owing to its annexation as a colony by Great Britain. They were direct descendants of the Dutch who had established a port of call near the Cape of Good Hope in 1662. Some 30 years after the British occupied the cape in 1806, the Boer farmers trekked into the interior and settled in Natal and subsequently in the Orange Free State and the Transvaal. The

British government recognized the independence of the Transvaal in 1852, but in the face of the republic's bankruptcy in 1877 assumed general sovereignty. In 1880, the Boers made a successful armed effort for independence, the war terminating in a disastrous defeat for the British at Majuba Hill, and in March 1881, the independence of the Transvaal was again recognized under the suzerainty of Britain.

The discovery of gold in the Witwatersrand (or "Rand") in 1885 caused a large influx of foreigners who in time agitated for franchise and other rights. Relations with Britain became strained and the abortive Jameson Raid of 1896 convinced the Transvaal Republic that war with Britain was inevitable. A defensive alliance was formed with the sister republic, the Orange Free State, and Great Britain manifested a disposition to annex both republics as a means of protecting the interests of many subjects who had made settlements within the region. War broke out on Oct. 11, 1899, and the first battle of importance occurred at Ladysmith on Oct. 30 when the British met a reverse. Subsequently the Boers were defeated in a number of engagements, though they made a stubborn resistance, and on Oct. 25, 1900, the region was annexed by Great Britain. In 1907, the government greatly restricted the immigration of Asiatics. In 1910, the Transvaal was joined with the Cape of Good Hope Province, Natal, and the Orange Free State to form the Union of South Africa.

Transylvania (*trân-sîl-vă-ni-ă*), in German *Siebenbürgen*, a region in the southeastern part of Europe, a part of the Austro-Hungarian Empire until December 1918 when it was ceded to Rumania. The area is ca. 22,300 sq. m. It lies between the Carpathian and Transylvanian Mts., in western and central Rumania. The surface is largely mountainous, but it has many fertile valleys and plains. Among the chief rivers are the Somes and Mures. Gold, silver, copper, quick-silver, coal, lead, iron, salt, alum, tin, limestone, and precious stones are among the minerals. Fine forests are abundant. Agriculture is the leading industry; the products include wheat, hemp, maize, rye, barley, flax, tobacco, vegetables, and fruits. Stock-raising, silk culture, and manufacturing are likewise important industries. The manufactures include silk and woolen textiles, soap, paper, furniture, jewelry, glass, gunpowder, and machinery. Elementary schools have been established in all parts of Transylvania. The Cluj (Kolovzsvár) Univ. was founded in 1919. Secondary schools flourish in a number of the leading cities. Railroads have been constructed through most of the regions producing minerals and containing arable lands. The chief cities include Cluj, Brasov, and Oradea. Many of the inhabitants are Magyars, but the population in-

cludes Germans, Bulgarians, Walachians, Rumanians, and Gypsies. Transylvania belonged to Dacia at the time of the Roman Empire, but with the decline of Rome passed successively to the Huns, Lombards, and Goths. It became a part of Austria in 1713, a part of Hungary in 1868, and was transferred to Rumania in 1918. In territorial changes effected by Italian and German ministers at Vienna in August 1940, Rumania, in return for an Axis guarantee of her frontiers, ceded about half of Transylvania to Hungary, thus restoring to the latter country much of her pre-World War I mountain border in the east, leaving only the southern and southwestern portions of Transylvania to Rumania. When Hungary sued for peace during World War II, a territorial adjustment regarding the region again took place in favor of Rumania on Mar. 10, 1945. Population, ca. 3,500,000.

Trap (*trăp*), or TRAPPEAN ROCK, the name generally applied to the primary and secondary strata of igneous rocks. The name, derived from the Swedish word *trappa*, meaning "stairs," is given to these rocks because their greater hardness resisted erosion, thus making them stand out on hills and mountains like steps or stairs. They are formed chiefly of hornblende and feldspar. Those in which feldspar predominates are known as *feldspathic trap* and those composed largely of hornblende are called *hornblendic trap*, or *greenstone*. The latter is of a greenish color and is peculiarly crystalline. Feldspathic trap resembles flint in compactness and is of a light bluish or greenish color. Other species of trap rocks include the *clinkstones*, *basalts*, *pitchstones*, *feldspar*, *porphyries*, and *claystones*. Basalt is the heaviest of the trap rocks and is likewise the hardest and most compact. Rich agricultural soil is produced by the decay of trap rock, and districts having these rocks are usually quite fertile.

Trapani (*tră'pă-ně*), a capital of the province of Trapani, Sicily, 45 m. w. of Palermo, with which it is connected by railway. It is a seaport and has a municipal palace and several fine churches. The industries include salt works, shipyards, fisheries, and flour mills. It has a large trade in wine, olive oil, marble, shell cameos, and fruits. The Carthaginians fortified it in the 3rd century B.C., but it was taken by the Romans. Anciently it was known as Drepanum. Population, ca. 75,000.

Trap-door Spider (*trăp'dōr spī'dēr*). See *Spider*.

Trapping (*trăp'ing*), the art of catching birds and other animals by means of traps and snares. This mode of taking game is preferred because the skin and flesh are less liable to injury than by the use of weapons. Traps for catching various animals, such as the mink, beaver, and fox, are usually made of steel and vary in size according

to the kind of animal to be taken. The small traps have one steel spring, while those of larger size usually have two. The trap is set near the hole or habitation of the animal and is securely anchored so as to hold the captive. Usually the trapper sets a bait to lure the animal to the place where it may be caught, and usually visits each trap once or twice a day to remove the captives. Snares are commonly used to catch birds and some quadrupeds. Box traps are sometimes employed for the same purpose, but the use of box traps is forbidden in some countries.

Trappists (*trăp'ists*), the popular name of the Order of Cistercians of the Strict Observance or Reformed Cistercians, derived from the name of the monastery of La Trappe in the diocese of Séez, France. The Trappists are properly called Cistercians (*q.v.*) and represent an attempt to restore the stricter observance of the rules governing the eating of meat and a few other foods. The Trappists came into existence after the efforts of Denis Largentier, Martin de Vargas, and Abbot de Rance (of La Trappe) to introduce the strict observance into all the houses of the Order. The matter was settled by Pope Alexander VII in the Bull of April 19, 1666, whereby those monasteries which chose not to follow the strict observance of not eating meat, were allowed their autonomy under the name of the Cistercians of the Common Observance, whereas the Trappists were designated the Cistercians of the Strict Observance. Throughout the world, Trappist monasteries are much more numerous than those of the Cistercians of the Common Observance. In the U.S., the Trappists have greatly increased in number since the end of World War II.

Traubel (*trou'bél*), HELEN, singer, born in St. Louis, Mo. She studied music for several years under Madame Vetta Karst, and her career was further inspired by the interest of Walter Damrosch. She made her debut with the St. Louis Symphony in 1925 and her Metropolitan Opera debut in 1937, when she created the leading soprano role in Damrosch's "The Man Without a Country." She sang her first Wagnerian role at the Metropolitan in 1939 as *Sieglinde* in "Die Walküre" and subsequently distinguished herself in many Wagnerian roles. On the return of Kirsten Flagstad (*q.v.*) to Norway, the American soprano took over many of Flagstad's roles.

Trauma (*tră'mă*), a wound or an injury due to direct violence, such as from a blow, a cut, or a bullet; damage to the body due to exposure to extreme heat or cold, or to concussion from a blast. *Psychic trauma* is an unpleasant emotional experience with a variable and more or less permanent effect upon the mind and personality of the individual suffering the experience, often the underlying cause of psychoneuroses (*q.v.*)—partial alteration of personality without loss of con-

tact with the environment and reality. *Psychotic trauma* is acute mental and personality change with loss of contact with the environment and reality, such as the changes often seen after a severe head injury, or in cases of extreme alcoholism (*e.g.*, delirium tremens).

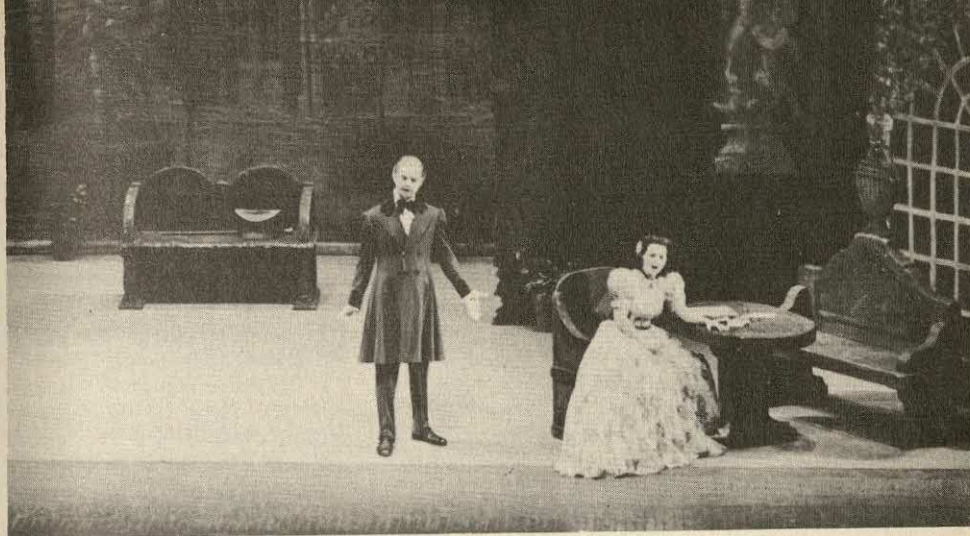
Traveler's Tree (*trăv'ê-lêrz trê*), a tree native to Madagascar, classed as a kind of plantain, having a palmlike appearance. The stem is smooth and without branches to a height of 20 to 30 ft., and at the top is a peculiar growth resembling a large fan. The leaves grow on extended stalks, which are on opposite sides of the upper stem of the tree, the lower leaves dropping off as the stem grows. A large tree has from 15 to 30 leaves, the leaf stalks being 10 ft. in length. The leaves are 5 to 6 ft. long and frequently about 3 ft. wide. The color of the leaves is bright green. They are used for thatching, while the leaf stalks serve in constructing walls and other parts of buildings. The tree produces a succulent fruit, growing in bunches, and the seeds yield a flour utilized by the natives as a food. The tree derived its name from the hollow leaf-stalk, which contains water even in the dry season.

Traverse City (*trăv'êrs sî't'y*), county seat of Grand Traverse County, Michigan, in the lower peninsula of Michigan, on Grand Traverse Bay. It is on the Chesapeake & Ohio, Pennsylvania, and Manistee & Northeastern R.R.'s. It is also served by air and bus lines. From its airport is operated the only inland U.S. Coast Guard Air Station. Traverse City is a favorite summer resort and visited by many hay-fever sufferers. It is the home of the National Cherry Festival, held annually in July. Four canning plants and divers industries are located in the city. Clinch Park includes a zoo of native Michigan animals and a museum of Indian relics. The city was settled in 1850 and incorporated in 1895. Population, 1940, 14,455; in 1950, 16,974.

Travertine (*trăv'êr-tîn*), a species of limestone. It is usually whitish in color and occurs in masses deposited by the action of rivers and springs. Fossils of leaves and twigs are common in some deposits. Many buildings in Rome are constructed of this class of rock.

Traviata (*tră-vyă'tă*), LA, a three-act opera by Giuseppe Verdi, with a libretto based on Alexandre Dumas fils' "Camille." When it was performed for the first time in Venice, in 1853, it was a failure but the music-loving world soon recognized its value. The opera was first produced in America at New York City in 1856.

Travis (*trăv'is*), WILLIAM BARRETT, soldier, born in Edgefield County, South Carolina, Aug. 9, 1809; died March 6, 1836. He studied law and practiced at Claiborne, Ala. In 1832 he went to Texas and joined the battle for Texan independence. He commanded the force which hero-



Courtesy Metropolitan Opera Press Bureau, N. Y.

LA TRAVIATA, ACT II

ically defended the Alamo (*q.v.*) during a Mexican siege and with five other survivors was massacred by the Mexicans after surrendering.

Trawling (*trāl'ing*), a method of fishing in the deep sea. It consists of dragging a net along the bottom behind a boat, or by attaching the ends to two small steam vessels, which move slowly and pull the net. A *trawl* or beam trawl is a purse-shaped net from 50 to 70 ft. long, and the mouth is held open by a wooden beam. This net is drawn by a single boat; larger sizes, in which the mouth is 40 ft. wide, may be pulled by two vessels. Trawling can be done only where the bottom is smooth or sandy, and is usually not permitted near the shore. Much of the fishing in the North Sea is done by this method, where large quantities of herring, haddock, and mackerel are taken. The term *trawl* is applied in America to a long line to which short lines with baited hooks are attached.

Treadmill (*tréd'míl*), an appliance used to discipline prisoners, employed formerly in Great Britain. It consists of a wheel in the form of a long cylinder, furnished with steps around its circumference, and is moved by the tread of the prisoners. A handrail furnishes support, and the weight of the prisoner causes the wheel to revolve. Formerly it was customary to utilize the motive power of the treadmill for grinding corn and turning machinery with animals or men furnishing the motive power, but the labor expended upon it is too large in proportion to the usefulness of this contrivance. A similar device powered by horses was at various times used for supplying power, most notably for boats antedating the steamboat.

Treason (*trē'z'n*), the crime of levying war or committing any act of hostility against a state by one who owes allegiance to it. The punishment for this offense is very severe, since the

crime is held to be one of the greatest of which any citizen may be guilty. Those who know of the crime of treason and fail to disclose the fact to the authorities are guilty of concealment of treason, which is punishable by fine and imprisonment. In general, treason consists in pursuing espionage or giving aid and support to the enemy of one's country. The punishment depends upon the occasion or circumstances under which the crime was committed. If committed at a time of great national hazard, the guilty party is usually punished by death.

Treasure Island (*trēzh'ēr ī'land*), a famous adventure story by the British novelist, Robert Louis Stevenson (*q.v.*), published in 1883.

Treasure-Trove (*trēzh'ēr-trōv'*), the name applied to coin, bullion, or precious metals found hidden in the earth or any private place, the ownership of which is unknown. Objects of value thus found on land belonging to the finder, under the law of Rome, belonged to the person who discovered the treasure, but if the land belonged to someone else the objects found were divided equally between the finder and the owner of the premises. The common law of England vests the ownership of such treasures in the crown, though this is not strictly enforced. In the U.S., a treasure found belongs to the finder, unless the true owner is known, when the title is vested in him.

Treasury Bills (*trēzh'ēr-ỹ bīlz*), obligations or bills of exchange issued by a government for short periods, usually of three, six, or 12 months, at a discount, the difference between the price payable for the bills and the nominal value of them representing the interest.

Treasury Department (*trēzh'ēr-ē dê-pārt'mēt*), THE. See *United States, Departments of*.

Treaty (*trē'ty*), a contract or agreement concluded by two or more nations or sovereigns. It

is in the nature of a contract, and the parties to it rely upon the good faith of those concerned to carry out the matters stipulated. Treaties are usually made by commissioners duly appointed by the respective governments, and they are binding upon the nations concerned as soon as they are ratified by the sovereigns or the branch of government duly authorized to approve such agreements. In general, the power to ratify is vested in the crown of a monarchy and in the chief executive and legislative branch of republics. The latter is the case in the U.S.; negotiations are conducted by commissioners and the power to ratify is vested in the President and the Senate. Treaties are known according to the purpose for which they are intended, as *offensive and defensive, treaties of alliance, commercial treaties, and treaties of peace*.

Treaty Port (*trē'ti pōrt*), any of a number of ports in the Far East which were open by treaty to foreign trade at a time when the general policy of the country was isolationism. As a result of uncontrolled traffic in opium, abetted by British merchants but forbidden by the Chinese government, Britain and China engaged in the Opium War (1839-42). The Treaty of Nanking terminated hostilities and provided, among other concessions, for the opening of the five ports of Canton, Amoy, Foochow, Ningpo, and Shanghai to British residence and commerce. A supplementary treaty in 1843 contained the essentials of extraterritoriality. In the next few years, the U.S., France, Russia, and other European nations hastened to obtain similar rights for themselves and their citizens. By 1900 there were about 30 treaty ports. In 1912 China opened all her ports to foreign trade. The first two treaty ports in Japan (1854) resulted from the visit of Com. M. C. Perry (*q.v.*). Later there were others, and all of Japan's ports were opened in 1899. See *China; Far Eastern Question*.

Trebbia (*trēb'byā*), a river in the northern part of Italy, anciently called *Trebia*. It rises 15 m. n.e. of Genoa, in the Ligurian Apennines, and, after a course of 58 m., joins the Po near Piacenza. The Trebbia is famous in history, owing to the defeat of the Romans under Sempronius by Hannibal in 218 B.C. The Austrians and Russians under Suvaroff defeated the French under MacDonald. in 1799, upon its banks.

Trebizond (*trēb'i-zōnd*) or TRABZON, a seaport in Asiatic Turkey, capital of Trabzon Province, on the southeastern coast of the Black Sea. It is surrounded by hills and set within substantial walls, outside of which are numerous suburbs. Several forts defend the city. The harbor, modernized recently (1945-49), is one of the finest on the Black Sea, thus giving the city excellent facilities to handle a large interior and export trade. Among the principal structures are a

number of mosques, several hospitals and government buildings, and 10 Greek churches. It has manufactures of fabrics, hardware, copper products, dyestuffs, and clothing, and is the center of a large export trade in wool, wax, oil, raw and manufactured silk, and tobacco products. The city was anciently known as Trapezus and flourished in the time of Xenophon. The Romans conquered it in the Mithridatian War. Trajan constructed extensive harbor improvements at this place. The Crusaders captured it in 1204, when it became the capital of the Empire of Trebizond, which included a large region south of the Black Sea. It has been in possession of Turkey since 1461, though Russia held it briefly after World War I. Population, 1960, 52,680.

Tree (*trē*), in botany, a woody-tissued perennial plant having a central stem or trunk and generally over 10 ft. in height at full maturity; some exceptionally tall trees, however, reach heights of over 300 ft. Trees branch out at a considerable distance above the ground, and these branches, their twigs, and the main trunk are covered with bark. The branches may bear foliage (such as leaves and flowers), nuts, berries, fruits, or cones. Trees bearing the latter are called *conifers*, the majority of which are *evergreen*; nevertheless, some coniferous trees, such as the larch, are *deciduous*, i.e., shed their leaves in the autumn. The leaf structure of conifers is generally needlelike, e.g., pine-needles. Trees may be divided into numerous classifications or species, differing widely among themselves as to growth, appearance, etc. No precise distinction can be made between trees and shrubs, except for the presence of the long single main stem of trees as opposed to the lower growth and branching out of shrubs or bushes. See *Maple; Oak; Pine*; etc.; *Wood*.

Tree, SIR HERBERT BEERBOHM, actor and theatrical manager, born in London, England, Dec. 17, 1853; died there, July 2, 1917. The half brother of Max Beerbohm, he was educated in London and Germany. He made his first professional appearance in 1878 at the Globe Theatre and subsequently scored many successes, notably in "The Private Secretary" (1884). He was manager of the Haymarket Theatre, London, 1887-96, and in 1897 built and opened Her Majesty's Theatre, where he produced many of Shakespeare's plays. He published "An Essay on the Imaginative Faculty" (1893), "Thoughts and Afterthoughts" (1913), and "Nothing Matters" (1917).

Tree Frog (*trē fróg*), of TREE TOAD, a class of tailless batrachians that form the connection between the toads and the frogs. They live chiefly in trees, which they are able to climb by reason of their claw-shaped toes. The upper jaw and vomers have teeth. They are small, more active, and brighter colored than the true frogs, and

utter loud, piping notes. Many species have been enumerated, but most are found in the warmer regions. They differ widely in color, though most of them take on the hues of trees.

Tree Squirrel (*skwûr'el*). See *Squirrel*.

Trefoil (*trê'foil*), or BIRD'S-FOOT, a genus of plants of the bean family. Many species are native to the temperate region of the Northern Hemisphere. The common trefoil has a stem from 4 to 15 in. long, which usually is spreading and decumbent, and bears from four to 10 yellow flowers. Some have associated this flower with the shamrock of Ireland. Several species are native and others have been introduced in Canada and the U.S. These plants include a number which are of value as forage and are grown to some extent for fertilizer, being covered by poisoning.

Treitschke (*trîch'ke*), HEINRICH VON, historian, born in Dresden, Sept. 15, 1834; died in Berlin, Apr. 28, 1896. He studied history at the Univs. of Bonn, Leipzig, and Heidelberg and became successively professor of history at the Univs. of Kiel, Heidelberg and, from 1874 to his death, Berlin. He was also appointed historiographer of Prussia (1886). A strong liberal at the beginning, he was later a collaborator of Bismarck and one of the most devoted supporters of the Hohenzollern dynasty. As a member of the German Reichstag (1871-96) and as a political writer, he was a powerful instigator of German chauvinism. He wrote a "History of Germany in the 19th Century."

Tremolite (*trêm'ô-lit*), a species of hornblende. It consists chiefly of calcium and magnesia and has a white or grayish color. The forms are usually prismatic and crystalline.

Tremor (*trêm'ér*), in medicine, shaking and trembling of specific muscles; caused by epilepsy, hysteria, general fright, excessive drinking, poisoning by certain metals, etc.

Trench (*trêch*), an excavation in the earth, made during a siege, for the purpose of defense in an open field, or to protect troops as they advance toward a besieged place. Trench warfare reached its greatest extent in France, both for offense and defense, in the great battles fought between 1914-18. An estimate made in 1917 placed the trench works between Switzerland and the North Sea, a battle line of 450 m., at fully 12,000 m., including the reinforced works at Verdun and Amiens.

Trench, RICHARD CHENEVIX, clergyman and author, born in Dublin, Ireland, Sept. 9, 1807; died in London, England, Mar. 28, 1886. In 1829, he was graduated from Cambridge where he was a friend of Tennyson, Hallam, and Kemble, and, after traveling for several years, settled as a clergyman in Hampshire. In 1835, he published "Story of Justin Martyr and Other Poems," a work of

considerable merit, and in 1842 issued his "Poems from Eastern Sources." He became dean of Westminster in 1856, and was archbishop of Dublin from 1864 to 1884. He was buried in Westminster Abbey. Among the most noteworthy of his publications not already named are "A Study of Words" and "Sacred Latin Poetry."

Trench Foot (*trêch fôot*). See *Occupational Diseases*.

Trent (*trênt*), a river of Canada, in Ontario. It rises in Rice Lake and discharges into the Bay of Quinté, an inlet from Lake Ontario. The length is 150 m. and it provides good water power. It drains a basin of 4,000 sq. m.

Trent, a river of England, which rises in Staffordshire and 15 m. west of Hull joins the Ouse to form the Humber. The total length is 145 m.; it is navigable for barges about two-thirds of its course. In commercial importance it ranks next to the Severn and the Thames. The Trent & Mersey Canal is one of several important artificial waterways of the system in which the Trent is a factor.

Trent, or TRIENT, a city in northern Italy, in the southern part of Tyrol, 48 m. N. of Verona. It is located on the Adige River, has railroad facilities, and is surrounded by limestone hills. The Adige valley is remarkably fertile, containing fine farms, vineyards, and orchards. Trent is celebrated in history as the seat of the Council of Trent, which met here in the pontificate of Paul III in 1545, but was removed to Bologna the following year. It was dispersed in the latter year as a result of the Protestant rising in Germany, but was again convoked by Pope Julius III, in 1551, and was again dispersed by the Lutherans. Pius IV called it into session in 1560, although it did not actually reconvene until 1562. In 1563, its labors were completed. The Council of Trent issued canons and decrees defining the doctrines of the Roman Catholic Church. The city of Trent has considerable trade, numerous schools and churches, and has public parks and a library. It was a free imperial city until 1802, when it became a part of Austria, and in 1920 was made a part of Italy. Population, ca. 35,000.

Trent, WILLIAM PETERFIELD, author and literary critic, born in Richmond, Va., Nov. 10, 1862; died in 1939. He completed a course of instruction at the Univ. of Virginia and subsequently at the Johns Hopkins Univ. In 1888, he was made professor of English in the Univ. of the South at Sewanee, Tenn., remaining there until 1900, when he became professor of English literature in Columbia Univ. He founded the *Sewanee Review* in 1892 and was its editor about eight years. Besides contributing to periodical literature, he published a number of historical works and criticisms. Among his chief publications are "The Authority of Criticism," "Eng-

lish Culture in Virginia," "Southern Statesmen of the Old Regime," "War and Civilization," and "A History of American Literature."

Trent Affair (*trĕnt a-jâr'*), an incident which occurred in diplomatic relations between the U.S. and Great Britain at the beginning of the Civil War in America. On Nov. 8, 1861, the British merchant ship *Trent* carrying James M. Mason and John Slidell (*qq.v.*), Confederate commissioners, to Europe was stopped near the Bahamas by the U.S. *San Jacinto*, commanded by Capt. Charles Wilkes. The two commissioners were seized and sent to Boston, where they were interned as prisoners of war. Captain Wilkes' action was generally approved in the Northern states, but Great Britain sharply protested the move as a violation of international law. To avoid an open rupture and possible war with Great Britain, Mason and Slidell were released by the U.S. in January 1862.

Trent, COUNCIL OF. See *Trent*, Italy.

Trenton (*trĕn'tŏn*), a city of Missouri, seat of Grundy County, on the Thompson River, ca. 100 m. N.E. of Kansas City. It is on the Chicago, Rock Island and Pacific R.R. Trenton is a commercial and business center for a wide farming and coal-producing area. Railroad shops and food-processing plants are located here. Trenton was settled ca. 1834, incorporated in 1857, and chartered as a city in 1893. Population, 1950, 6,157.

Trenton, capital of New Jersey, seat of Mercer County, 55 m. S.W. of New York, N.Y., and 30 m. N.E. of Philadelphia. It is situated on the eastern bank of the Delaware River, at the head of ocean-going navigation. It covers an area of 7.7 sq. m. The city is served by the Pennsylvania and the Reading R.R.'s. Mercer County Airport is nearby, and helicopter service from downtown Trenton connects the city with Newark and New York City. Ships from the Port of

Trenton carry goods to coastal cities and world ports.

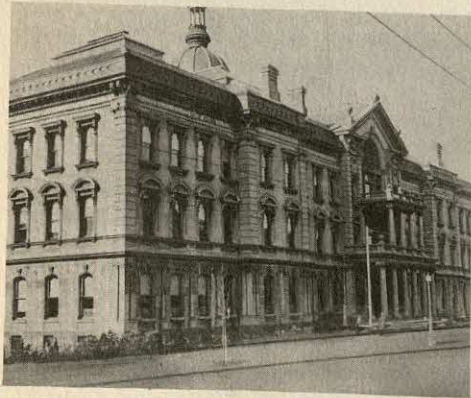
Trenton is the seat of Trenton State Coll. and Trenton Junior Coll. The annual public-school enrollment is ca. 15,000; the parochial schools enroll another 12,000 students.

An industrial as well as a business and commercial center, Trenton carries on the manufacture of pottery, rubber products, wire and cable, machinery, structural steel, clothing, steam turbines, and refrigerators, among others. The standard metropolitan area of Trenton, which includes Mercer County, had a value added by manufacture of \$302,999,000 in 1954; the figure for the city proper was \$186,572,000.

Trenton is the site of the Statehouse (ca. 1792), the state capitol annex (1931), which contains the state library and museum, and many state institutions, including a school for the deaf, a hospital for the mentally ill, a home for girls, and a prison. Other landmarks include the Old Masonic Temple (1793), "Ye Olde Barracks" (1758-59, restored), and the Old Friends Meeting House (1739). The Trent House (ca. 1719) is the city's oldest structure.

The area was first settled in 1679 by Mahlon Stacy, an English Quaker, who established a log mill at what was known as "ye flalles of ye De La Warr." Trenton derived its name from William Trent, a Philadelphia merchant, who purchased land here in 1714. In 1776 it was the scene of the Battle of Trenton (*q.v.*) commemorated by the city with a battle monument, consisting of a granite shaft 150 ft. high topped by a bronze statue of Washington. In 1784 the U.S. Congress met here. Trenton became the capital of the state in 1790, was chartered as a city in 1792, and served temporarily as the seat of the Federal government in 1799. Trenton established a commission form of government in 1911 and again in 1939. Population, 1940, 124,697; in 1950, 128,009.

Trenton, BATTLE OF, an engagement of the Revolutionary War, fought at Trenton, N.J.,



Courtesy Trenton Chamber of Commerce

STATEHOUSE OF NEW JERSEY

In Trenton, built at the close of the 18th century



Courtesy The Bettman Archive, N.Y.

BATTLE OF TRENTON

Painting by Alonzo Chappel (1828-87)

on Dec. 26, 1776. A British garrison of 1,200 Hessians, under the command of Col. Johann Rall, was stationed at Trenton when George Washington, after retreating from a series of defeats by the British in New York, gathered his forces on the other side of the Delaware River. While the Hessians were engaged in their Christmas festivities, Washington crossed the Delaware through floating ice to a point 8 m. above the enemy. His force of 2,500 men, divided into two units, approached the town by two roads. Surprising the Hessian outpost, they then fell upon the unprepared main body. Cut off from retreat, their commander fatally wounded, 950 Hessians quickly surrendered. Washington then recrossed the Delaware and occupied his old position. This victory and that of Princeton, N.J., on Jan. 3, 1777, were the first successes won by Washington, and they revived American spirits.

Trenton Limestone (Group) (*trěn'tūn līm'stōn grōp*), a sequence of rocks deposited during the Middle Ordovician epoch and named from the type section at Trenton Falls on West Canada Creek (Oneida County, N.Y.). In New York State, the Trenton limestone is extensively developed both to the west and east of the Adirondack Mts.; to the west its maximum thickness is about 300 ft., and to the northeast at least 350 ft. Characteristic fossils are bryozoa, brachiopods, and trilobites. Rocks of Trenton age also extend over large areas in the U.S. and the southern part of Canada. They are composed chiefly of limestone and in various places contain valuable minerals, such as natural gas and petroleum in Ohio, Illinois, and Indiana, and lead and zinc ores in Iowa and Wisconsin. In Canada, outcrops extend along the northern shores of Lake Ontario as far west as Georgian Bay. In thickness the sequence ranges from 100 to 2000 ft.; its greatest thickness is in Pennsylvania.

Trepang (*trē-pāng'*), or SEA SLUG, or BÊCHE-DE-MER, any of several members of the class of sea cucumber (*q.v.*). They are found off northern Australia, the East Indies, and the East Coast of the U.S. The trepang, which ranges up to 3 ft. in length, has a soft, elongated body and tubular feet. Caught in large numbers, trepangs are boiled, dried, and smoked for use as food, chiefly in China, where they are valued as an ingredient of soups.

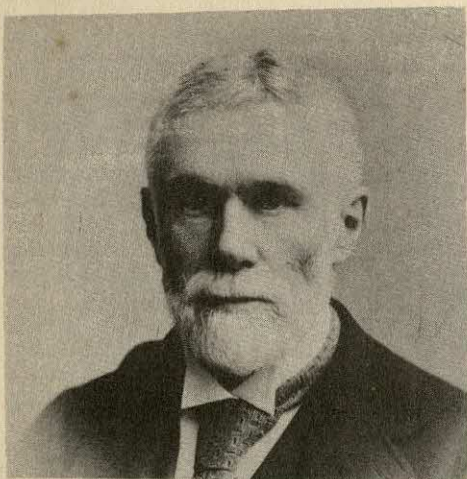
Trephining (*trē-fīn'ing*), or TREPPANNING, an operation on the human skull, which consists of cutting an opening or making a perforation with the trephine, or trepan. The cutting edge of this instrument consists of a circular saw-toothed device about half an inch in diameter and is operated by means of a handle, similar to that of an auger. In case of fracture, especially where broken fragments of bone extend across the brain,

this instrument is useful in cutting the attached end so it can be removed. Cerebral abscesses are often relieved by trephining, but the openings are made as small as possible, usually one-fourth of an inch, and if necessary are afterward enlarged by the chisel.

Trespass (*trēs'pās*), in law, an offense committed against a person, the property, or the rights of another, such as an unlawful but peaceable entry upon the property of another. Mere words, without some action, do not constitute a trespass. A suit at law for damages may be maintained in such a case and the intention of the trespasser is immaterial, since the law takes into account the damages and not the intention. A person who aids or incites the perpetration of a trespass is liable as well as the direct perpetrator, and the principal who has given authority to an agent may be liable for trespass committed by the latter. A peaceable entry into a house or upon the land of another, with intention to take possession and oust the true owner, is regarded as a trespass. One who enters the house of another without permission, or walks over his ground, or suffers cattle or other livestock to stray upon it, commits the offense of trespass, and the owner has the right to an action for damages. In cases where a municipality or county places a restraint upon cattle and other livestock running upon the streets and highways, the owner of such stock is guilty of trespass if he permits it to run at large. In such a case he is subject to a fine, and, if such stock enters upon private property, he may be held liable for damages.

Trevelyan (*trē-vēl'yan*), GEORGE MACAULAY, historian, born in Welcombe, Stratford-on-Avon, England, Feb. 16, 1876; died in Cambridge, July 21, 1962. A son of Sir George Trevelyan, he was educated at Harrow and at Trinity Coll., Cambridge. During World War I he served at the Italian front. In 1927-40 he was regius professor of modern history at Cambridge. In 1940 he became master of Trinity Coll. He was author of "England Under the Stuarts" (1902); "Garibaldi" (1907-11); "History of England" (1926), "England Under Queen Anne" (1930-34), and "English Social History" (1944).

Trevelyan, SIR GEORGE OTTO, writer and statesman, born at Rothley Temple, Leicestershire, England, July 20, 1838; died Aug. 16, 1928. He was the son of Sir Charles Edward Trevelyan, an Anglo-Indian official, and Hannah More Macaulay, sister of the historian Thomas Babington Macaulay (*q.v.*). He studied at Harrow and at Trinity Coll., Cambridge, and entered the East Indian civil service in 1862. He was a member of Parliament as a Liberal in 1865, and 1868-97. He held several government posts and was a member of the cabinet under Gladstone. He was a leader in the movement to abolish



Courtesy Brown Bros., N. Y.

GEORGE TREVELYAN

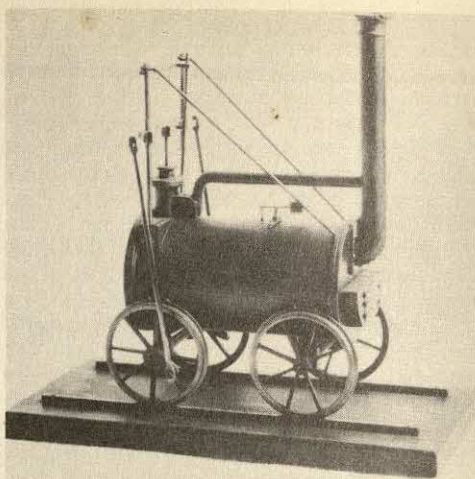
the purchase of army commissions and favored extension of the suffrage. He retired from public life in 1897. In 1911, he received the Order of Merit, one of the highest honors of the Empire.

Trevelyan is far more interesting as a writer than as a statesman. He is noted for his vivid style and a sparkling wit. He wrote a biography of his uncle, "The Life and Letters of Lord Macaulay" (1876), and an account of "The American Revolution" (four vols., 1899-1909). Other works are "The Early History of Charles James Fox" (1880), "George III and Charles James Fox" (1912-14), and "Cawnpore" (1865). Trevelyan's writings in a lighter vein include "The Competition Wallah" (1864), "The Ladies in Parliament and Other Pieces" (1868), and "Interludes in Prose and Verse" (1905).

Treves (*trēvz*). See Trier.

Treviso (*trā-vē'zō*), the Roman *Tarvisium*, a town in the Italian department of Venezia Euganea, capital of the province of Treviso, 18 m. n. of Venice, on the Sile River. The Duomo, dating from the 15th century, contains pictures by Titian and Pordenone. It was the seat of a Lombard duke in the 6th century, was independent after the Peace of Constance (1183), and was ruled by Venice after 1339. In 1797, Mortier, Napoleon's marshal, duke of Treviso, captured it with a French army. Population, over 50,000.

Trevithick (*trēv'ī-thīk*), RICHARD, engineer and inventor, born in Cornwall, England, Apr. 13, 1771; died Apr. 22, 1833. He became one of the pioneers in the field of railroad locomotives. By 1796, he was exhibiting models of high-pressure steam engines, and, in 1802, he patented a full-sized vehicle. Later, with Andrew Vivian, he applied steam to hauling railway loads. Although considered by some to be the inventor of the



Courtesy Santa Fe Railway

LOCOMOTIVE MODEL BY TREVITHICK, 1802

locomotive steam engine, preference is given to Stephenson (*q.v.*) as the inventor. Trevithick built an automobile (propelled by steam) in 1801. After an unsuccessful venture in Peru, he returned to England in 1827 to spend the remainder of his days in experimentation. Although he reaped little reward for his inventions, they formed a valuable stepping-stone for future engineers in practical applications. See also *Automobile*.

Triangle (*trī'ān-g'l*), in geometry, a polygon having three sides. Any side may be called the *base*; the apex of the angle opposite the base is the *vertex*; and the lines extending from the base to form the vertex are termed the *sides*. The angles of the triangle are the angles formed by the sides with each other. Triangles are classed according to the relative length of their sides—into *equilateral*, or equal-sided; *isosceles*, or with two sides equal; and *scalene*, or unequal-sided. A triangle is a *right* triangle if one of its angles is a right angle. It is an *obtuse* triangle when one of its angles is greater than a right angle, it is an *acute* triangle when it has no angle as great as a right angle, and it is *equiangular* when all of its angles are equal. The area of a triangle is the product of one-half the base by the altitude. Generally the word triangle is understood to mean a *plane*, or *rectilinear*, triangle in which the sides are straight lines. A triangle whose three lines are curved is said to be *curvilinear*. A *spherical* triangle is one whose sides are arcs of great circles of the sphere. The area of a spherical triangle is $\pi r^2 \frac{E}{180}$, where r is the radius of the sphere, and E is the spherical excess, which is found by subtracting 180 from the sum of the three angles.

Trianon (*trĕ-ă-nôn'*), or GRAND TRIANON, the name of a villa built by Louis XIV in Versailles, France. This structure was completed in 1685 as a residence for Madame Maintenon and is a handsome building of one story. It was the scene of the trial of Marshal Bazaine in 1873. Another building, known as the Petit Trianon, was built for Madame du Barry by Louis XV in 1776. Near this are several Swiss cottages and a lake. Marie Antoinette resided here for some time.

In the Grand Trianon on June 4, 1920, the Treaty of Trianon was signed between Hungary and the Allies following World War I. Hungary, separated from Austria, was reduced from a maritime power of 125,000 sq. m. to a landlocked fourth-rate country of 35,000 sq. m., and lost Slovakia and Ruthenia to Czechoslovakia; Transylvania to Rumania; Croatia-Slavonia, Bosnia, and Herzegovina, to Yugoslavia; Fiume, to be made a free state; and Burgenland to Austria. Reparations were imposed, and the Hungarian army cut to 35,000 men. The Hungarian merchant fleet and 20 per cent of the river fleet were surrendered. In addition, Hungary was forced to furnish certain supplies to other countries.

Triassic System (*trĭ-ăs'ik- sĭs'tĕm*), the oldest division of rocks of the Mesozoic era. In stratigraphic sequence the Triassic follows the Permian system (Paleozoic era) and in turn is followed by the Jurassic system (Mesozoic era). The name originated from the fact that in Germany at the type section the rocks of Triassic age were grouped in three divisions, termed, from oldest to youngest, the *Bunter*, the *Muschelkalk*, and the *Keuper*. (1) The *Bunter* ranges from about 600 to 2,000 ft. in thickness and consists mainly of sandstones but also contains clays and conglomerates. This part of the Triassic is thought to represent stream deposits, wind-blown sand dunes, and deposits in lagoons at the sea margin, and is similar to the Triassic formations of eastern North America and of part of the Western Interior region. (2) The *Muschelkalk*, about 800 to 1,100 ft. in thickness, is of marine origin, mostly limestone but in part dolomite, shale, anhydrite, gypsum, and rock salt. (3) The *Keuper* ranges from 800 to about 2,000 ft. in thickness and includes shale and sandstone of nonmarine origin, and also in places salt, gypsum, and beds with marine fossils. The beds originally included in the *Keuper* were later divided into two units, the name *Keuper* being retained for the lower unit and the term *Rhaetic* being given to the upper unit.

The region in Europe in which the continental sediments of Triassic age predominate includes England, eastern France, Germany, western Russia, and Spain. The marine rocks occur chiefly in the Alps district and southeastern Europe. The

Triassic deposits of the Mediterranean region extend eastward into the Himalayan region of Asia where they attain a considerable thickness. Deposits of Triassic age occur also in eastern Siberia and Japan, in the East Indies, Australia, and New Zealand. The Triassic is known in South Africa and is well developed in parts of South America. North America contains Triassic rocks (1) in a series of elongate narrow troughs trending from northeast to southwest along the Atlantic border, (2) in a very large part of the Western Interior region, and (3) along the Pacific border. The Atlantic areas show only nonmarine strata of late Triassic age with red or reddish-brown sandstone and sandy shale predominating, reaching a thickness of 10,000 to 20,000 ft. Dark-colored igneous rocks occurring in sheets parallel to the bedding of the sedimentary rocks are a striking feature of the Triassic areas and are topographically prominent, forming long hogback ridges and in places making conspicuous cliffs such as the Palisades of the Hudson River and West Rock at New Haven. The Triassic of the Western Interior is mainly nonmarine and consists of red beds, varicolored shale and gypsum, the thickness ranging from about 1,000 to 5,000 ft. The Pacific border Triassic is largely marine and reaches a thickness up to 16,000 ft. Volcanic materials are widespread and abundant. Fossils that are found in the Triassic rocks include fernlike forms, conifers, fishes, reptiles, and the earliest mammals yet discovered. The economic products of the Triassic include salt, gypsum, and building stone.

Tribe (*trib*), the term applied to a subdivision of a nation or stock that has not been organized as a civil state. The principal divisions of the Roman people were known as tribes. In general, the development of a nation begins with the clan, passes through the tribal state, and finally merges into the larger and more completely organized body known as the nation. Romulus divided the Romans into the three tribes known as the *Ramnenses*, the *Titienses*, and the *Luceres*, who probably represented the Latin, the Sabine, and the Etruscan elements, respectively. Each of these tribes were subdivided into 10 *curiae*, and these were required to furnish a given proportion of the military forces for general defense and offense. The ancient people of Greece are frequently mentioned as divided into tribes, which appear to have developed from various clans, and later from territorial or political divisions. Since the Greeks were a nation of different races, the tribes frequently constituted classes distinguished by rights. Anciently the term tribe was used extensively in reference to the Teutonic peoples, and different divisions of them are mentioned in history as the Germanic tribes. In American history we have characteristic examples of tribal organization. For instance, the Seneca tribe

was constituted of eight totem kins. Historians usually term the five tribes of the Iroquois as the Five Nations and refer to any federation of clans under the general term of tribe. The Old Testament speaks of the 12 tribes of Israel.

Triboluminescence (*trī'bō-lū-mīn-ēs'ēns*). See *Phosphorescence*.

Tribune (*trīb'ūn*), an officer of the ancient Romans, whose duty was to preside over a tribe for the purpose of administration, or to represent it in some official capacity. Originally a tribune represented or stood at the head of each of the three patrician tribes, the *Ramnenses*, the *Titenses*, and the *Luceres*, which originally included the entire body of Roman citizens. Later the term came to have a wider signification. The plebeian tribunes defended their order against the patrician magistrates, and subsequently from three to six military tribunes with consular powers were elected annually. Another class of officers were the military tribunes, who were above the centurions and directly under the commander-in-chief. Each legion had six such tribunes. During the time of the kingdom they were appointed by the king, but the consuls exercised this power in the republic. During the later portion of the republic they were elected by the people in the assembly of the tribes.

Trichina (*trī-kī'nā*), a minute spiral flesh worm discovered in 1835 by Sir James Paget. It is parasitic in the sexually matured stage in the small intestine and in the larval stage in the voluntary muscles of man, swine, and other mammals. The worm in the larval stage measures about $\frac{1}{8}$ in. long and $\frac{1}{200}$ in. wide. It is scarcely visible to the naked eye. In the mature stage the male is about $\frac{1}{8}$ in. and the female $\frac{1}{4}$ in. The female produces large numbers of embryos in the small intestine, whence they bore their way through the intestinal wall and pass into the muscles of the body, where they surround themselves by a cyst, which afterward becomes calcareous. The larva may remain encysted for 10 or more years and undergoes further development only when the infected flesh is eaten by a suitable host, when the sexually mature stage is attained in the alimentary canal. Trichinae can enter the human system only by being ingested with insufficiently cooked flesh, and, being swallowed alive, they soon develop to maturity and multiply in great numbers. Persons infected in this manner have swellings of the face and limbs, which are accompanied by a fever, and death results if aggravated cases are not treated promptly. The flesh of swine is the most prolific source of infection to man. Other animals frequently infected include rats, dogs, rabbits, mice, badgers, and moles.

Trichiniasis (*trī-kī-nī'āsīs*). See *Trichinosis*.

Trichinosis (*trī-kī-nō'sīs*), or TRICHINIASIS, a

disease of man caused by the presence of the small parasitic worm *Trichinella spiralis*, or its larvae. This parasite is found frequently in the flesh of certain domestic and wild animals, and is implanted in man by the ingestion of raw or undercooked pork, and occasionally bear meat. About six or seven days after ingestion of infected meat there is a variable onset of symptoms according to the number of trichinae which are present, and which pass from the intestinal tract via the blood stream into various organs and tissues, especially lungs and muscles, where they encyst and cause both local and general toxic reactions. There may be nausea, vomiting, diarrhea, muscle pain, swelling of the face and eyelids, laryngitis, hemorrhages into the skin, cough, pain in the chest, difficulty in swallowing and in breathing. In certain cases there may be even pneumonia or involvement of the nervous system. Frequently typhoid fever is simulated. Special skin-test reactions and examination of a tiny bit of muscle removed from the patient are helpful in diagnosing the condition. Trichinosis is difficult to treat, but the patient usually recovers, although the calcified cysts of the trichina worm larvae may be noted in the muscles years later. Occasionally this disease may be fatal if too many trichinae are ingested. Important preventive measures include finding and destroying the source of infected meat, elimination of rats (whence hogs and other animals are infected by eating rats), discouragement of the common practice of feeding garbage to hogs, rigid inspection of all pork products before they reach the consumer, and most important, thorough cooking of all fresh pork products if not government inspected and labeled. See *Trichina*.

Tricolor (*trī'kūl-ēr*), the national banner of France, which consists of blue, white, and red colors in broad columns parallel to the flagstaff. The sections are equal in size and the colors are arranged in the order named, the blue being next to the staff.

Tridione (*trī-dī-ōn*), a new synthetic chemical compound which possesses analgesic (pain-relieving) and sedative (quieting, sleep-inducing) properties. It has been shown to have remarkable anticonvulsant properties in experiments with animals. In humans it is reported to be more effective than older drugs in controlling certain types of epileptic seizures and fits, especially the so-called psychomotor seizures (convulsions). Tridione appears to be most effective when used in conjunction with other standard drugs such as the barbiturates, the bromides, and dilantin sodium. Tridione offers promise of effective control of convulsive disorders previously most resistant to treatment. Frequently producing undesirable toxic side effects, it should be used only under observation of a physician.

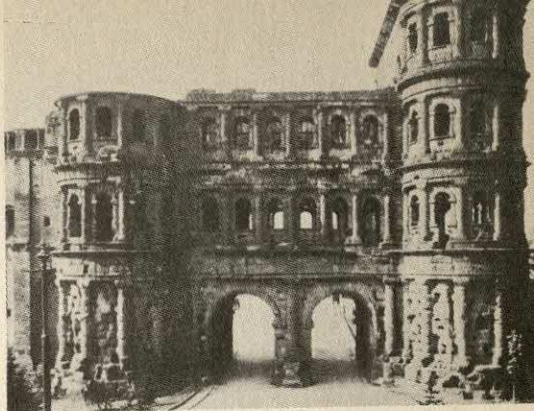
Trier (*trēr*), OF TREVES, a city in Germany, in the *Land Rhineland-Palatinate*, on the Moselle River, 68 m. s.w. of Coblenz. Trier is a center of the Moselle wine-trade region and has a school of viniculture. Its industries are varied, consisting of tobacco processing and the manufacture of machinery, textiles, and leather goods. Trier is a Roman Catholic archbishopric; it has a Catholic theological faculty and a pedagogic academy.

The city's fame, however, rests in its history. It has been said that Trier even antedates Rome, although no evidence has been established to this effect. The city was named Augusta Treverum by the Romans in the early years of the empire, and from the 3rd through the 5th centuries A.D. it was an imperial residence, serving the emperors Constantine the Great, Valentinian I, II, and III, and Gratian. It is rich in historic structures, such as the 6th-century cathedral, Roman thermal baths, an amphitheater, and the Porta Nigra, a city gate of the 3rd century A.D. Trier possesses a holy coat said to be the seamless robe of Christ and a nail reputedly from the cross of Mt. Calvary. The grave of St. Matthias, the only Apostle buried north of the Alps, is located in the city.

In the course of its existence, Trier has undergone a great many administrative changes; an independent archbishopric in 902-1797, it was a margraviate as well from the 13th century on. It became part of France under Napoleon, and since its incorporation into Prussia in 1814 it has been German. Population, 1955, 86,226.

Trieste (*trē-čst'*), in Yugoslav, *TRST*, a city in Italy at the northeast corner of the Adriatic Sea, on the Gulf of Trieste, ca. 70 m. E. of Venice. It is bounded on the N., E., and S. by Yugoslavia, and connected in the W. to the rest of Italy by a thin strip of land. The city has a fine harbor extending for 8 m. along the gulf, and is on the Paris-Milan-Belgrade railroad line. A center for a lively import and export trade, it supports heavy industry—shipping, shipbuilding, steel mills, and oil refineries—with imported raw materials. There is also a flourishing insurance business. The city, divided into old and new sections, extends from the Gulf to San Giusto Hill, where there is a cathedral, part of which dates from the 6th century, and a 15th-century castle. There are also museums and a university (1924).

Tergeste was the name of the city when it was a rich Roman colony. It became a free commune in 1295, and, after long commercial rivalry with Venice, it placed itself under the protection of Austria in 1382. It was made a free port in 1719, and, as the only Austrian seaport, it flourished. After World War I it went to Italy, and from 1919 to 1947 it was part of the former region of Venezia Giulia. It was heavily bombed in 1944. At the end of World War II, Trieste,



TRIER. PORTA NIGRA

inhabited by persons of Italian and Yugoslav descent, was claimed by both Italy and Yugoslavia. Under the Italian peace treaty of 1947, Italy gave up the city of Trieste; and it was formed, with the Istrian Peninsula of Yugoslavia, into the Free Territory of Trieste under the protection of the U.N. The territory was temporarily divided into two military zones—Zone A, including the city, was administered by Anglo-American troops, and Zone B, the Istrian peninsula, was under Yugoslav military jurisdiction. A permanent settlement was made in 1954, when the area was demilitarized and partitioned and U.N. protection was ended. Italy received ca. 90 sq. m. (most of Zone A, with a population of ca. 225,000), and Yugoslavia ca. 200 sq. m. (Zone B and a small additional strip of land, with ca. 73,000 inhabitants), as well as the right of emergency use of the port. Population, 1958 (est.), 286,905.

Trigeminal Nerve (*trī-jēm'i-nāl nērv*), in anatomy, the main nerve of the face, which is divided into three main branches; it is often the seat of neuralgias.

Trigonometry (*trīg'ō-nōm'ē-trī*), a branch of mathematics dealing with the relations between the parts of a triangle (*q.v.*) and the properties of the trigonometric functions which are always defined in order to study these relations. The word trigonometry itself indicates the origin of the subject, since it is derived from two Greek words, *trigōnon* and *metron*, meaning triangle measure. Thales (640 to 546 B.C.), the Greek mathematician and philosopher, used methods which we would now call trigonometric to measure the height of the Egyptian pyramids by means of the lengths of their shadows. Even today, Scots learn to measure heights of objects by their shadows. For example, let h be the unknown height of the tree CB shown in Figure 1. The shadow of the tree is measured and found to be 100 ft., and the shadow of a 6-ft. pole is measured and found to be 10 ft. Then, by means of a theorem on similar triangles, we have $h/100 = 6/10$ or $h = 60$ ft.

The ratio, $h/100$ or $6/10$, used in the previous

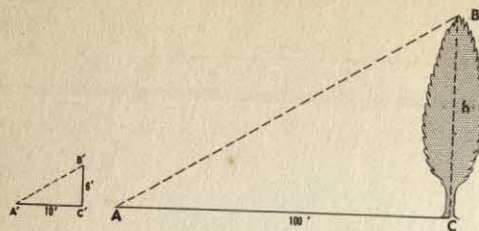


Figure 1

example, is called the tangent of the angle A , and, depending on the nature of the given data in a problem, six different ratios are convenient to use in solving for unknown parts. To define these six ratios for an acute angle, it is convenient to construct a right triangle containing the acute angle, as in Figure 2, and to name the

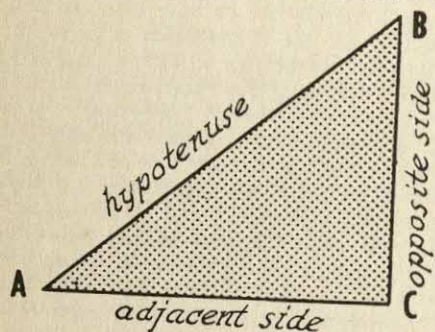


Figure 2

sides with respect to the angle A as shown in the figure. Then the 6 ratios are named and abbreviated as follows:

| Name | Abbreviation | Meaning |
|---------------|----------------------------|---|
| sine A | $= \sin A$ | $= \frac{\text{opposite side}}{\text{hypotenuse}}$ |
| cosine A | $= \cos A$ | $= \frac{\text{adjacent side}}{\text{hypotenuse}}$ |
| tangent A | $= \tan A$ | $= \frac{\text{opposite side}}{\text{adjacent side}}$ |
| cotangent A | $= \cot A = \text{ctn } A$ | $= \frac{\text{adjacent side}}{\text{opposite side}}$ |
| secant A | $= \sec A$ | $= \frac{\text{hypotenuse}}{\text{adjacent side}}$ |
| cosecant A | $= \csc A$ | $= \frac{\text{hypotenuse}}{\text{opposite side}}$ |

For the solution of simple problems the last two ratios are unnecessary, and so, in some elementary textbooks, they are omitted; however, in certain practical problems their use simplifies computation. The values of the trigonometric ratios for all useful values of the angle are computed and listed in tables. The computation for 30° , 45° , 60° , and multiples and fractional parts of these angles, can be carried out by elementary geometry (see *Geometry*) and trigonometry, but, for any angle, the computation is carried out by means of an infinite series which is obtained by methods of differential calculus.

TRIGONOMETRY

The six trigonometric ratios make possible more accurate solutions of many problems of surveying and navigation in which the length of a line joining two points or the size of an angle is desired but cannot be measured directly. For example, to find the distance across an impassable swamp CB (see Figure 3) a conven-

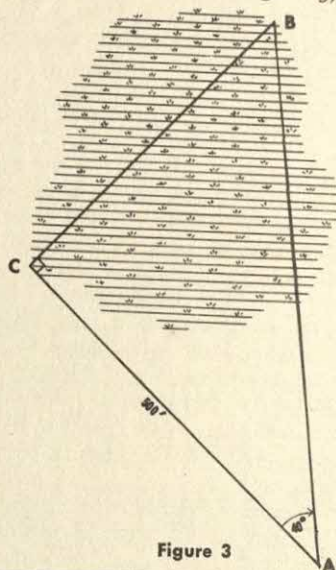


Figure 3

ient distance CA is measured in a direction perpendicular to CB , and the angle CAB is measured. If CA is 500 ft. and the angle CAB is 40° , then, by the definition of the tangent of A , we have $\tan 40^\circ = CB/500$. The value of $\tan 40^\circ$ is found in a table of tangents as .8391, whence $CB = 500 \times .8391 = 420$ ft.

In navigation of ships at sea, the direction in which the ship is to be steered, called the course, and the distance the ship is to be sailed, must be found. If the distance is small—for example, the distance to be sailed in one day—then it is possible to assume that the surface of the earth to be traversed is flat and to apply the methods of plane trigonometry. For example, if a ship is to be sailed from Cape May, N.J., to Montauk Point, L.I. (see Figure 4), we first find the latitude and longitude of these places in tables such as those in Bowditch's "American Practical Navigator." From these data the number of geographical miles (1 geographical mile = 6080.2 ft) corresponding to the differences in longitude and latitude between these two places is determined. In this case they are 143 m. and 128 m. respectively. Then by the definition of the tangent, $\tan C = 143/128 = 1.117$, whence from the table of values of the tangent we find that $C = 48^\circ 10'$. The distance CM can be found by the theorem of Pythagoras (see *Pythagoras*) or by the definition of the cosine. Thus $\cos 48^\circ 10' = 128/CM$,

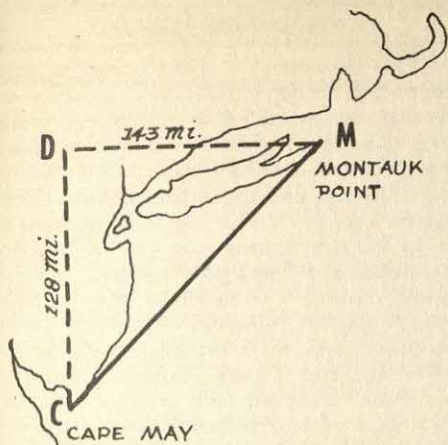


Figure 4

whence $CM = 128 / \cos 48^\circ 10' = 128 / .6670 = 192$ m.

A similar problem arises when the latitude and longitude of a ship are to be found by dead reckoning. In this problem, the latitude and longitude of the ship at a previous hour and its course and distance since that time are known.

In air navigation the actual direction of flight of an airplane can be computed by the use of trigonometric ratios. Thus, suppose a plane is heading due north with a speed of 150 m.p.h. and a wind is blowing due west with a speed of 50 m.p.h., as illustrated in Figure 5. Then the actual direction of flight of the plane, given by the angle C , can be found from the definition of the tangent of C . Thus $\tan C = 50/150 = .3333$, whence by means of a table of the values of the tangent, we find $C = 18^\circ 26'$. The speed v in this direction can be found by means of the sine or cosine. Thus $\sin 18^\circ 26' = 50/v$, whence $v = 50 / \sin 18^\circ 26' = 50 / .3162 = 158$ m.p.h.

The great importance of problems in navigation makes it desirable to solve these problems easily and quickly. Hence, in practical navigation on the sea and in the air, many devices, instruments, charts, etc., are developed which will yield the necessary results with a minimum of effort and time. Even when it is necessary to take into account the fact that the surface of the earth is the surface of a sphere, the methods of solving navigation problems, although basically dependent on spherical trigonometry, are so designed that they become almost automatic and can be worked easily and rapidly.

The definitions of the trigonometric ratios lead to certain algebraic properties that simplify the manipulation of mathematical symbols in more advanced mathematics. Some of these properties are evident from the definitions; for example, $\sin A = 1/\csc A$ and $\tan A = \sin A / \cos A$. Others such as $\sin^2 A + \cos^2 A = 1$ follow quite easily from the definitions and the theorem of Pythagoras. Still other relations such as \sin

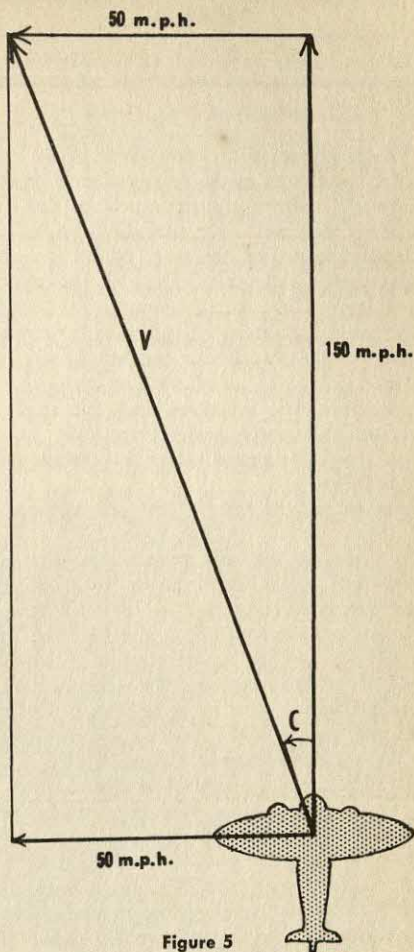


Figure 5

$(A + B) = \sin A \cos B + \cos A \sin B$ involve more lengthy proofs.

The trigonometric ratios of an acute angle can be generalized to define the trigonometric ratios for any angle. These general definitions are usu-

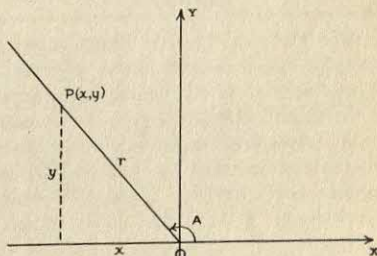


Figure 6

ally given in terms of an angle of any size which is placed so that its vertex is at the origin of a rectangular coordinate system, and one side, called the initial side, lies along the positive x axis (see Figure 6). Let the coordinates of any point P on the other side of the angle, called the terminal side, be (x, y) and the distance OP be r .

Then the general definitions of the trigonometric ratios are:

$$\begin{array}{ll} \sin A = y/r & \cot A = x/y \\ \cos A = x/r & \sec A = r/x \\ \tan A = y/x & \csc A = r/y \end{array}$$

The extension of the definitions of the trigonometric ratios to angles of any size brings into evidence a most important aspect of the trigonometric functions: their periodicity. If we consider the values of the sine, or of any other trigonometric ratio, as the size of the angle A increases, we find that the value of the ratio is determined for almost all values of the angle A . Thus, for example, we can say that the sine of A is a function (*q.v.*) of A . Further, the values of the trigonometric functions, after the angle has increased sufficiently, repeat themselves. For example, for the sine the values for certain angles are as follows:

| | | | | | | | | | | | |
|-------|----|-----|-----|------|------|------|------|------|------|------|------|
| angle | 0° | 45° | 90° | 135° | 180° | 225° | 270° | 315° | 360° | 405° | 450° |
| sine | 0 | .7 | 1 | .7 | 0 | -.7 | -1 | -.7 | 0 | .7 | 1 |

The values of the sine repeat after the angle passes 360°, again after it passes 720°, and every time the angle increases by 360°. When this behavior is shown on a graph, where the angle, usually denoted here by x instead of A , is plotted on the horizontal axis, and the value of the sine, usually denoted here by y , is plotted vertically, we have the graph of $y = \sin x$ shown in Figure 7. The wavelike shape of the graph of $y = \sin x$ shows the periodic character of this function. Because of the periodic character of the trigonometric functions, and especially the wavelike shape of both the sine and cosine, these functions are extremely useful in dealing with periodic phenomena. Among those phenomena which are either periodic or approximately so are: physical phenomena such as sound, alternating elec-

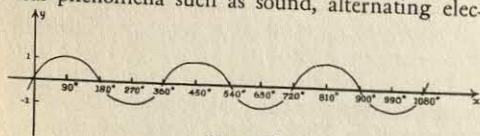


Figure 7

tric current, and radio waves; astronomical phenomena such as time and tides; physiological phenomena such as breathing and the pulsation of the blood; and economic phenomena such as the business cycle and the fluctuations in price of certain commodities with the season of the year.

Trillium (*tril'i-ŭm*), a genus of perennial herbs belonging to the lily family, native to North America.

Trinidad (*trin'i-dād*), a city in southern Colorado, seat of Las Animas County, on the Purgatoire River, 80 m. s. of Pueblo, located ca. 6,000 ft. above sea level. It is served by the Atchison, Topeka and Santa Fe and other railroads. It is surrounded by irrigated farm land and grazing country, where beans, sugar beets, grains, and alfalfa are grown and cattle, sheep, and poultry

are raised. The city is a shipping center for these products and for the bituminous coal located in the nearby mountains. Chief manufactures are bricks, tiles, sheet metal, and household appliances. Before the site was permanently settled, in 1859, it was a camping spot for travelers on the Sante Fe Trail (*q.v.*). The city was incorporated in 1879. Population, 1940, 13,223; in 1960, 10,691.

Trinidad and Tobago (*tō-bā'dō*), an independent republic, a member of the (British) Commonwealth of Nations, 10 m. off the coast of Venezuela, consisting of the neighboring islands of Trinidad and Tobago. Trinidad, separated from Venezuela by the Gulf of Paria, is immediately south of the Windward Islands and is the most southerly of the West Indian islands. It is 50 m. long and close to 40 m. wide and has an area of 1,864 sq. m. Tobago is 21 m. to the northeast; it is 26 m. long and about 7 m. wide and has an area of 116 sq. m. To the northeast is Little Tobago, a tiny isle known for its bird of paradise sanctuary. The northern section of Trinidad is mountainous; the highest point of the three low east-to-west ranges is El Cerro del Aripo (3,085 ft.). Tobago's mountains rise to just over 1,800 ft.

The islands have a tropical climate, with temperatures of up to 84° F. and abundant rainfall. Agriculture provides a livelihood for many, and sugar is the leading crop; bananas, cacao, coffee, citrus fruit, and coconuts are grown. Prosperous Trinidad has gained wealth as a leading oil producer of the area and, secondarily, as the world's chief supplier of asphalt. The asphalt is taken from Pitch Lake, a huge, seemingly unlimited deposit near La Brea in the southwest. Rapidly developing industries include brewing, glassmaking, sawmilling, spinning and weaving, and the manufacture of cement, small boats, time-recording instruments, pharmaceuticals, paints and varnishes, rubber goods, and typewriters and adding machines. Tourism also produces a significant income.

Port of Spain, in northwest Trinidad, the capital of the country, is also the largest city and an active Caribbean port; its population in 1960 numbered 93,954. Scarborough, the chief town on Tobago, has about 1,500 inhabitants. The country has about 2,500 m. of roads and slightly more than 100 m. of government-owned railroads.

Columbus discovered Trinidad, and probably Tobago, in 1498, naming the former after the Trinity because of the three mountains visible from his ship. Trinidad was taken from Spain in 1797 by the British, who acquired it formally by the treaty of Amiens (1802). Tobago, settled by the Dutch in 1654, changed hands often among the Dutch, French, and English, before going finally to Britain in 1814; it was joined to Trinidad in 1889. It is thought to be the island de-

scribed by Daniel Defoe (*q.v.*) in "Robinson Crusoe."

The country, a former British colony which gained its independence on Aug. 31, 1962, is governed by an elected senate and house of representatives and a prime minister. Queen Elizabeth II is recognized as sovereign and is represented by a governor general. In 1941 Great Britain leased Trinidad base sites to the U.S. for 99 years; the U.S. gave up several thousand acres in 1961 and reduced the lease term to only 17 more years. From 1958 to 1962 Trinidad and Tobago were members of the federation of The West Indies (see *West Indies, The*). Population, 1960, Trinidad, 792,624; Tobago, 33,333.

Trinity (*trīn'ī-tī*), a river in Texas, formed near Dallas by a group of streams which rise in the northern part of the state. It flows southward into Galveston Bay and has a length of 360 m.

Trinity, DOCTRINE OF THE, the Christian doctrine that the divine nature has three persons, the Father, the Son, and the Holy Ghost. See *Creed*.

Trinity Sunday (*sūn'dī*), a festival honoring the Trinity and falling on the Sunday immediately following Pentecost (also known as Whit-sunday), which is also the eighth Sunday after Easter. Established by Pope John XXII in 1320, the festival is celebrated by Roman Catholics and Protestants but not by the Greek Church. Episcopalians and Lutherans call the Sundays from Trinity to Advent Sundays "after Trinity," while the Roman Catholic Church lists the Sundays as being "after Pentecost."

Trio (*trē'ō*), in music, a composition for three voices or instruments. A *piano trio* is a composition written for the piano, cello, and violin. A *string trio* is one written for the violin, viola, and cello, or two violins and a cello. In a minuet the term trio signifies the passage, formerly called the *menuetto*, which alternates with the minuet proper.

Triolein (*trī-ō'lē-īn*). See *Fat*.

Tripalmitin (*trī-pāl'mī-tīn*). See *Fat*.

Triple Alliance (*trīp'l āl-ī'qns*), the name applied to several treaties among European nations. In 1668 Sweden, England, and The Netherlands formed a league to protect the Spanish provinces against Louis XIV of France. A triple alliance was concluded by Great Britain, France, and The Netherlands in 1717 against Spain; it became the Quadruple Alliance (*q.v.*) when Austria joined in 1718. The most significant triple alliance was the league of Germany, Austria-Hungary, and Italy, formed in 1882 and periodically renewed until World War I. To maintain the balance of power in Europe, the Triple Entente (*q.v.*) was formed in counterbalance to it.

Triple Entente (*trīp'l ān-tānt'*), the diplomatic alliance of England, France, and Russia, formed for the purpose of opposing the Triple

Alliance (*q.v.*) of Germany, Austria-Hungary, and Italy. In 1891 France obtained a *rapprochement* from Russia; in 1893 the two nations signed a military convention and, in 1894, concluded a Dual Alliance. France and Great Britain, despite conflicting territorial ambitions in Africa and Asia, reached an understanding, the *Entente Cordiale* (*q.v.*), in 1904. In 1907 Russia, by joining Great Britain, completed the Triple Entente. Italy signed a North African agreement with France in 1902 and in 1915 renounced her Triple Alliance with Germany and Austria to join the Allies in World War I.

Tripod (*trī'pōd*), a three-legged stool, vessel, or table. Tripods were much used in ancient Greece as altars; one of the most noted was the Tripod at which the priestess at Delphi sat to deliver her oracles. In modern usage, the tripod is generally a three-legged stand supporting a camera or other instrument.

Tripoli (*trīp'ō-lī*), or ROTTENSTONE, a porous, lightweight, soft silica rock, composed of the residue left after calcium carbonate in limestone and chert rock has been dissolved out by geologic weathering. It is found in natural deposits in Europe, Russia, North Africa, Canada, and the following states of the U.S.: Alabama, Arkansas, Georgia, Illinois, Mississippi, Missouri, Oklahoma, Pennsylvania, and Tennessee. Tripoli is used as a filler for paints and rubber; as an abrasive; as a base for scouring soaps, cleansing and polishing powders; and as an absorbent and filtering material.

Tripoli, Arabic name, TARABULUS ESH SHAM, a city in Lebanon, situated on the Mediterranean Sea, 40 m. N.E. of Beirut. A port with considerable trade, it is the terminus of a pipeline carrying crude oil from Iraq and has an oil refinery, as well as cotton gins and soap factories. Citrus fruits, vegetables, olives, tobacco, millet, and wheat are grown; and sponges are taken from local waters. An important Phoenician city, it went successively to the Seleucids, the Romans, and A.D. 638 to the Arabs. It surrendered in 1109, after a lengthy struggle, to the Crusaders. Destroyed by the sultan of Egypt in 1289, it was soon rebuilt. In 1918 it was taken from Turkey by British troops in Palestine, and in 1920 it was incorporated in the state of Grand Liban. The British and Free French occupied the city in 1941 (during World War II), and on Nov. 26, 1941, it became part of Lebanon. The British and French troops left the city in 1946. Population, ca. 100,000.

Tripoli, Arabic name, TARABULUS EL GHARB, called OEA by the Phoenicians, a Mediterranean port in North Africa, the winter capital of Libya (Bengasi is the summer capital), and the capital of the Libyan province of Tripolitania. It is Libya's chief city and center of trade and a

focus of rail and highway travel. Probably a Tyrian colony in the 7th century B.C., it was later ruled by Rome, the Vandals, the Arabs, who occupied it from the 7th century A.D. to the middle of the 16th century, the Spanish, who captured it in 1510, and later by the Knights of St. John. In 1551 it went to Turkey, and, as a Barbary pirate base, it was blockaded by the U.S. (1801-05). Occupied in 1911 by Italy, to whom it went under the treaty of Ouchy (1912), it became the capital of the Italian colony of Libya and in 1951 the capital of the independent kingdom of Libya. It was a major Axis base in World War II until its capture (1943) by British troops. The city has walls dating from Roman times, as well as a triumphal arch erected in honor of Marcus Aurelius, A.D. 163. Wheelus Field, a U.S. air base, is 5 m. E. of the city. Population, ca. 130,000. See also *Tripolitania*.

Tripolitania (*trī-pŏ-lĭ-tā-nĭ-q*), or TRIPOLI, a province of northwestern Libya. The area is ca. 106,500 sq. m.; Tripoli (*q.v.*) is the capital. The coast is generally low and sandy, while the interior is an elevated plateau consisting of sandy desert with fertile oases. There is little agricultural production, and the chief products are fruits, vegetables, cereals, wines, olive oil, castor oil, henna, and alfa grass. The Carthaginians, Romans, and Greeks successively possessed Tripolitania, and in the 7th century it was conquered by the Arabs in their effort to spread Mohammedanism throughout the Mediterranean world. The Knights of St. John held the country from 1530 to 1551, when it passed into Turkish possession. Pirates infested the coasts and preyed on commerce. In 1912, as a result of war between Turkey and Italy, it became part of Italian Libya. Tripolitania was the scene of heavy warfare during the North African campaign of World War II, falling to the Allies on Jan. 23, 1943. Under the terms of the Italian peace treaty, signed in 1947, Tripolitania was surrendered to the Allies and continued under British military administration until 1951, when it became one of the three provinces of the new independent monarchy of Libya (*q.v.*). Population ca. 770,500, including ca. 45,000 Italians.

Tripolitan War (*trī-pŏl'i-tan wŏr*), a series of conflicts between the U.S. and the Barbary States (Algiers, Morocco, Tripoli, and Tunis), 1801-05 and 1815. The war was declared in 1801 by Tripoli when the U.S. refused to increase the tribute it had been paying under a 1799 treaty for immunity from Barbary pirate raids on its Mediterranean shipping. The U.S. immediately sent a fleet to blockade Tripoli, and in the struggle that followed the U.S. frigate *Philadelphia* and all her crew were captured and the port of Derna was taken by the U.S. A settlement was negotiated in 1805, but in subsequent years the

raids were resumed, and in 1815 Capt. Stephen Decatur (*q.v.*) was sent to Tripoli with a naval squadron. He forced cessation of raids on U.S. ships and the end of U.S. tribute payments. See also *Piracy*.

Tripolite (*trī-pŏ-lĭt*), a diatomaceous earth, so named from deposits found near Tripoli, North Africa. See *Kieselguhr*.

Tirreme (*trī-rēm*), a vessel or galley used by the ancient Greeks, Carthaginians, and Romans. It was the largest vessel employed, containing three benches of oars on each side and carrying large square sails to be raised in a fair wind, though sails were not employed while the vessel was in naval action. A trierarch commanded the vessel, which was often manned by as many as 200 men, who were able to move it with considerable swiftness. In engagements, it was used to ram the vessels of the enemy, in order to disable them by destroying a large number of oars or by crushing the sides of the vessels. Galleys with five benches of oars later replaced the tirreme.

Tristan (*trīs'tan*), or TRISTRAM, the hero of a Welsh or Celtic romantic legend which originated independently but early became incorporated in the Arthurian cycle. Tristan, a knight of the Round Table (*q.v.*), nephew of King Mark of Cornwall, was bringing Iseult of Ireland to be his uncle's bride. Unknowingly, he drank with her a magic potion that united them in everlasting love. Discovered by Mark, Tristan fled to Wales and then to Brittany, where he married another Iseult, although still loving the Irish princess. Wounded, he sent for his first love, but, when informed by his jealous wife that the first Iseult would not come, he died of grief. His love, hearing of his death, died also. Sir Thomas Malory, Alfred Tennyson, Matthew Arnold, Algernon Charles Swinburne, and Richard Wagner (*qq.v.*) have dealt with the Tristan theme. In 1927 Edwin Arlington Robinson (*q.v.*) used the theme in his "Tristram," which won him the 1928 Pulitzer Prize for poetry.

Tristearin (*trī-stē'g-rĭn*). See *Fat*.

Tritium (*trī'tĕ-ŭm*), or TRITIUM, a radioactive isotope of hydrogen, H³, having a mass of 3. It is used in the hydrogen bomb (*q.v.*) and as a tracer in scientific studies. See also *Hydrogen*.

Triton (*trī'tŭn*), in Greek mythology, one of the minor sea gods, the only son of Poseidon and Amphitrite. An aquatic being, with the body and head of a man and the tail of a fish, he is usually represented mounted on a sea monster and holding in his hand a conch-shell trumpet, with which he soothes the turbulent waves. His home was in the golden palace of his father beneath the Aegean Sea. In later Greek literature, the Tritons, the offspring of Triton, are described as riding over

the waters and blowing conch-shell trumpets.

For the amphibian Triton see *Triturus*.

Triturus (*trī-tū'rūs*), a genus of salamanders, more often known as newts, widely distributed in the Northern Hemisphere; they are found in Asia, Europe, the U.S., and northern Mexico. The front feet have four toes and the hind feet five. The spotted newt is a common species in the eastern U.S. Adults, which are aquatic, are about 3 in. long, olive-green in color, more or less spotted with red and black. In the land stage, the animal, then called an *eft*, is about 2 in. long and is orange-red with black-bordered crimson spots. After one to three years on land, the eft returns to water to breed; in some places there is no eft stage; the salamander spends its entire life in water. Breeding occurs in the spring; at that time the males develop horny excrescences on the inner surfaces of the thighs and the tips of the toes. The warty newt or great crested newt of Europe grows to be nearly $5\frac{1}{2}$ in. long. Its life history is much like that of the American spotted newt. Newts are commonly kept in aquaria; they feed on small crustacea, insect larvae, worms, tadpoles, and sometimes on other newts.

Triumph (*trī'ūmf*), the name of a solemn procession in ancient Rome, constituting the highest public honor bestowed upon a commander who had achieved great success in warfare. The pageant was led by the senate, followed by the spoils, carried by soldiers, and the prisoners; then came the victorious general or naval commander in a vehicle drawn by four horses, and the rear was brought up by the army of the victor. The procession extended along the Sacred Way to the Temple of Jupiter on the Capitoline hill, where sacrifices were offered. The triumph was concluded by a series of banquets and entertainments. It was customary to bring captives, especially hostile chiefs, to the pageant, and they were usually put to death during the triumphal march. The last triumph was celebrated in A.D. 302 by Diocletian.

Triumvirate (*trī-ūm'vī-rāt*), of Latin origin, meaning composed of three men; applied in ancient Rome to an office or commission simultaneously filled by three officials. The men constituting the triumvirate were called *triumvirs*; their duties were to execute jointly the obligations incumbent upon public officers. The two great coalitions, formed of the three most powerful individuals in the Roman empire, were the triumvirate of Julius Caesar, Crassus, and Pompey, in 60 B.C. (it was never formally recognized by the senate), and that of Octavian, Marc Antony, and Lepidus, in 43 B.C., renewed in 37 B.C. The former was ended by the defeat of Crassus in Mesopotamia, and the civil war soon after caused the death of Pompey, which resulted in the accession of Julius Caesar as dictator. The trium-

virate formed in 43 B.C., which received official recognition, was given highest powers by the senate. Under the triumvirate the empire was divided, Lepidus ruling in Italy (deposed in 36 B.C.), Marc Antony in the East, and Octavian in the West. After Marc Antony's defeat at Actium (31 B.C.), Octavian became Augustus, the leader of the whole Roman empire.

Troglodyte (*trōg'lō-dīt*), a name first used for a race of cave dwellers in ancient Greece; the term was later applied similarly in other countries. Uncivilized, these people made their homes in natural caverns or in caves dug in bluffs or hillsides.

Trogon (*trō'gōn*), a family of birds found in the warmer climates of both hemispheres. The bill is short and strong, the wings are moderate and rounded, and the legs and feet are rather weak. These birds have a richly colored plumage, usually metallic green above and red below, and some species have very long tails. Of the 50 species enumerated, more than half are found in America. They subsist largely on fruits, berries, and insects and build their nests in cavities of decayed trees. The voice is loud and unpleasant.

Trojan War (*trō'jan wār*). See *Troy*; *Homer*.

Trolley Car (*trōl'i kār*), a passenger vehicle, usually running on specially built tracks and electrically powered, used for urban transportation. The first experiments in the application of electric power to transportation are credited to Thomas Davenport, of Brandon, Vt., who in 1835 devised a model car powered by electricity. Later he set up a small railway in Springfield, Mass., over which he operated an electric engine. In 1857 Moses Farmer, Thomas Hall, and C. G. Page built an experimental electric railway, which ran from Washington, D.C., to Bladensburg, Md., $5\frac{1}{4}$ m., in 39 minutes. The first successful electric street railways were started in Montgomery, Ala., in 1886, and in Richmond, Va., in 1888. An interesting later development was the *trolley coach*, *trolley bus*, or *trackless trolley*, a rubber-tired bus drawing its power from overhead trolley wires and capable of flexible maneuvering in traffic. In many U.S. cities, the trolley car has been supplanted by the motor bus (*q.v.*), frequently operated by street railway companies under their trolley-car franchises. Trolley-car operation reached its height in 1923, when a total of 13,569,000,000 passengers were transported. See also *Electric Railway*; *Street Railway*; and color plates, *The Evolution of Land Transportation*, Volume XI.

Trolling (*trōl'ing*), a favorite method of angling to catch various kinds of fish. The lure is in the form of a spoon bait and is so attached to a line that it spins as it is drawn through the water; this spinning is made pos-

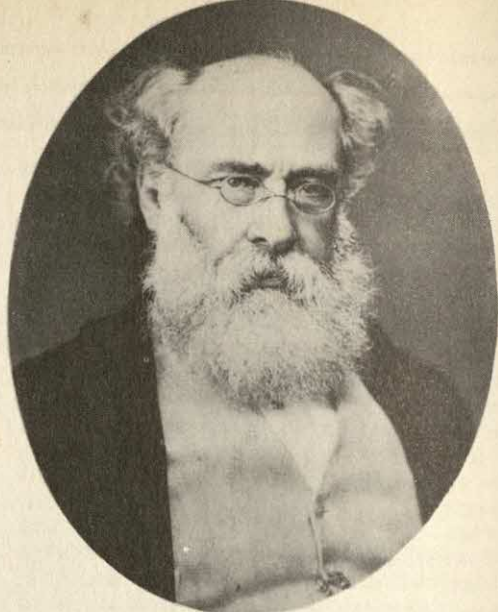
sible by the use of a swivel. The bluefish and several other fish are taken from a boat in motion, and some species are caught by throwing the lines so as to be carried by the current of tides or the flowing water in streams. Among the fish caught successfully by trolling are the pickerel, mackerel, tarpon, tuna, bass, and bluefish.

Trollope (*trol'ūp*), ANTHONY, novelist, born in London, Apr. 24, 1815; died Dec. 6, 1882. He was the son of Frances Trollope, an even more prolific writer than her son, and brother of Thomas Adolphus Trollope, also a writer. After a sketchy education, Trollope became a clerk in the British postal system in 1834 and had achieved considerable rank in the general post office by the time he resigned in 1867. He was instrumental in the establishment of the *Fortnightly Review* in 1865, and after his retirement from the post office, served three and a half years as editor of *St. Paul's Magazine*. In 1868, he was an unsuccessful candidate for Parliament.

In spite of his busy life as a public servant, Trollope wrote 47 novels, several volumes of short stories, several biographies (including "An Autobiography"), and a variety of travel books. His novels were extremely popular in his own day but then fell into disrepute for a time. However, Trollope is now recognized as one of the major English novelists. His current popularity is attested by the fact that 30 of his novels have been reprinted in inexpensive editions during recent years. He is popular partly because no novelist reflects more fully or more exactly than he the manners and *mores* of the Victorian period, but interest in him is by no means merely antiquarian.

Trollope's best-known novels are in two groups, usually known as the "Barsetshire series" and the "Parliamentary series." In the Barsetshire novels he concerns himself primarily with the life of the clergy in the imaginary English cathedral town of Barchester, in the imaginary county of Barsetshire, and with life among the country gentry. The series includes the following novels, published between 1855-67: "The Warden," "Barchester Towers," "Doctor Thorne," "Framley Parsonage," "The Small House at Allington" and "The Last Chronicle of Barset." Of these, the best known is "Barchester Towers," but "The Last Chronicle of Barset" is thought by many critics to be Trollope's finest work. Trollope himself thought it his best.

The Parliamentary novels concern themselves primarily with the life and interests of members of the British Parliament. The series includes the following novels, published between 1864 and 1880: "Can You Forgive Her?," "Phin-



Courtesy British Information Services, N. Y.

ANTHONY TROLLOPE

eas Finn," "The Eustace Diamonds," "Phineas Redux," "The Prime Minister," and "The Duke's Children." Of these, "The Prime Minister" is best known.

Notable rather for his sympathetic insight into character than for his plots, Trollope is assured a place in literature for such portraits as those of Mrs. Proudie, Mr. Harding, Archdeacon Grantly, and Mr. Crawley in the Barsetshire series, and of Plantagenet Palliser and Lady Glencora Palliser (later the Duke and Duchess of Omnium) and Lady Mabel Grex in the Parliamentary series.

Trollope's "An Autobiography" is a model of modesty and honesty. In it he discusses his various works in some detail and describes his method of composition at length.

Trolls (*trōlz*), the name applied in Scandinavian mythology to various supernatural beings. It sometimes refers to misshapen dwarfs and in other cases to giants. Trolls were looked upon as powerful and hostile to man, but were considered very stupid. Their stupidity made it possible to defeat them without difficulty, but great danger attended those who fell into their hands.

Trombone (*trōm'bōn*), a large instrument of the trumpet kind, having a deep and loud tone. It is one of the wind instruments possessing a complete chromatic scale, like the human voice or violin, and is considered a very valuable addition to the orchestra. The form generally used has a long tube bent twice upon itself and fitted at the outer bend with a U-shaped slide, by the motion of which the length of the vibrating air column may be adjusted so as to form any note within its compass. Three

kinds of trombones are in general use, called after their pitch the *alto*, *tenor*, and *bass* trombones. Some instruments are fitted with pistons, when they are known as *valve trombones*.

Tromp (*trômp*), CORNELIUS VAN, admiral, son of Martin van Tromp (*q.v.*), born at Rotterdam, Sept. 9, 1629; died May 29, 1691. He became a rear admiral in 1653, and served in the naval war against England in 1665-66, under De Ruyter (*q.v.*). He was deprived of his command in the latter year, but was reinstated in 1673, and in the same year demonstrated remarkable bravery and skill against the allied fleets of France and England. In 1675 he visited England, where he was honored by King Charles II. In 1676 he was made lieutenant admiral of the United Provinces.

Tromp, MARTIN HARPERTZDOON VAN, admiral, born at Brielle, Holland, in 1597; slain July 31, 1653. His father was a commander in the navy of Holland. The son went with his father to the East Indies in a merchantman in 1605, where both were captured and held as prisoners by the English for several years. He escaped to Holland, joined the navy in 1624, and later became lieutenant admiral. In 1639, he surprised and completely destroyed a Spanish fleet near Gravelines, off the coast of Holland, and was soon made admiral. He was defeated by an English fleet under Adm. Blake on May 19, 1652, but on Nov. 29 of the same year he defeated the latter in the Strait of Dover, and sailed up the channel without meeting material resistance. In 1653, another battle occurred, which lasted three days without decisive results, but Tromp was defeated with a loss of 17 vessels in June of the same year. On July 31, 1653, a decisive battle occurred off the coast of Holland, in which the Dutch lost 30 vessels and Adm. Tromp was killed by a musket bullet.

Trondheim (*trôn'hâm*), a city of Norway, at the mouth of the Nid River, 240 m. N. of Oslo. It is situated on the south shore of Trondheim Fjord, which is open for navigation the entire year, and has railroad connections to other points in Norway and Sweden. The chief buildings include the public library, the Lutheran Cathedral, and several institutions of learning. The public library has 110,000 volumes and with it is connected a museum of natural history. Among the manufactures are paper, sugar, machinery, snuff and cigars, canned and cured fish, and sailing vessels. It has a large export trade in timber, minerals, and fish. The city was founded in 996 and was long known as Nidaros. During World War II German submarines were hidden in specially built concrete pens near Trondheim. Although these were heavily bombed by Allied aircraft, the city itself was not injured. Population, *ca.* 56,000.

Troops (*troōps*), MECHANIZED and MOTORIZED, a development of modern warfare, by which an army moves forward "on wheels," preceded and/or supported by tanks or other heavy combat vehicles. Mechanized units are equipped with armed and armored combat vehicles such as tanks, half-track carriers, and gun carriers. Mechanized troops differ from motorized troops in that a motorized unit is provided with a means of transportation only, whereas a mechanized unit both travels in and fights from its vehicles. Horse cavalry (*q.v.*) has almost disappeared as a factor in modern warfare, except in terrain impassable by all other means, as a result of the motorization and mechanization of modern armies.

Trophy (*trō'fē*), originally a memorial erected on a field of battle to commemorate the deeds of valor of the victorious party. Trophies were erected by the Greeks and Romans. They consisted largely of the arms of slain enemies, placed upon a stone or metal pillar. The Romans, to make their trophies inviolable, consecrated them to Jupiter or some other deity. Trophies were allowed to perish by natural causes, since it was desired that hostile feelings should not be perpetuated, and any attempt to repair them when decayed was regarded as sacrilegious. Trophies have been erected in many modern churches and other buildings. These are usually carved in stone or bronze, and commemorate heroism and valued service.

The term has now come to mean any evidence or memorial of victory, particularly in the field of sports (*i.e.*, golf trophies, tennis trophies, etc.). It is often the award given to the victor at the end of a match or tournament.

Tropic Bird (*trop'ik bird*), a class of sea birds of the pelican family, having webbed feet, two elongated tail feathers, and a strong bill. They are frequently seen on the wing, being birds of powerful flight. Two well-known species are common to the Atlantic, Indian, and Pacific Oceans. The common *tropic bird* is about 30 in. long, with a wingspread of 40 in.

Tropics (*tróp'iks*), two small circles imagined drawn parallel to the Equator, situated about 23° 27' N. and S. of it. They serve to indicate the region at which the sun is seen in the zenith on the days of its greatest declination, and between them are included all the points on which the sun's rays fall vertically at any season of the year. The tropic north of the Equator is called the *Tropic of Cancer*, since the sun is in the constellation of Cancer when shining directly upon it, and the one south of the Equator is called the *Tropic of Capricorn*, because the sun, when shining directly upon it, is in the constellation of Capricorn. Between the two tropics lies the Torrid, or Hot, Zone, the climate of which is said to

be *tropical*. The width of the Torrid Zone is 47° and north and south of it are North and South Temperate Zones, respectively. Animals and plants in the tropics are larger and include more species than in any other zone, and birds are more numerous and of gayer plumage.

Troposphere (*trōp'ō-sfēr*). See *Atmosphere*.

Trotsky (*trōt'skē*), LEON DAVIDOVITCH (L.D. BRAUNSTEIN), Communist leader, born in Russia



LEON TROTSKY

in 1877; assassinated in Mexico City in 1940. In 1905, he was sent to Siberia for participation in the revolution of that year; after his release, in 1912, he established a revolutionary newspaper in Berlin and later in Paris. He began to publish *The New World*, a Russian paper, in New York, but returned to Russia in 1917, when Czar Nicholas was overthrown. He supported Nikolai Lenin and was elected president of the Moscow Soviet. His main field was foreign affairs and as commissar for this department he participated in the peace negotiations with Germany at Brest-Litovsk. Unwilling to sign the proposed treaty, he resigned his position.

To Trotsky goes the credit for the organization and training of the Red army. Unable to agree with Lenin's successor, Josef Stalin, on the subject of world revolution (Stalin was nationalistically minded while Trotsky advocated international Communism), he was banished from Russia in 1928 and found safety in Istanbul. Later he lived in Sweden and Mexico.

Trotting Race (*trōt'ing rās*), an American form of horse racing, for which a distinctive type of horse, called a trotter, is bred. He is run in harness from a light, two-wheeled vehicle known as a *sulky*.

The *trot* and the *pace* (or amble) are kindred gaits marking the transition between a walk and

a run, or gallop. The pace is the faster of the two. The trot is termed a "diagonal gait," since the horse raises a front and hind foot simultaneously on opposite sides of the body. In the pace, or "lateral gait," both feet on the same side of the body are moved simultaneously. Trotters or pacers never break into a run, and attain in harness a more consistent speed than is possible with other types of race horses. See also *Speed Records*.

Troubadour (*trōō'bā-dōōr*), or TROUVÈRE (*trōō-vār'*), the name given to a class of poets which appeared in Provence, in the south of France, near the close of the 11th century, but later spread to Spain and Italy. Like the Anglo-Saxon minstrels and the German minnesingers, the troubadours produced lyrical poetry, usually quite complicated in meter and rhyme. They devoted themselves to the musical art rather for the love of it than for profit.

The troubadour style and tradition are supposed to have been brought from the East by the Spaniards, of whom the French of Provence learned them and afterward gave them higher development. They became popular at the courts of kings and nobles, whose deeds they praised or censured in songs, though they more frequently sang of fancy and love on subjects selected by some lady. Some poems were devoted to the evils of the times, subjects of gallantry, conditions of society, and skill in military arts. The period in which they flourished was from 1085 until 1290.

Trout (*trout*), the name of many species of fish belonging to the salmon family, abundant in almost all the rivers and lakes of the temperate and colder zones. They are excellent food fishes, but differ from the salmon proper in that they frequent only bodies of fresh water. The *brook*, or *speckled trout* is common to the northern U.S. and Canada and is one of the favorite food fishes. It weighs 1 to 2 pounds, is 6 to 26 in. long, and has a brown or yellowish color with spots of red and black. Other American species include the *lake trout*, *mountain trout*, *Dolly Varden trout*, *blue-black trout*, *golden trout*, *salmon trout*, and *Mackinaw trout*. Several American species have been introduced to Europe, and the *common river trout* of Europe has been successfully planted in Canada and the U.S. Trout fishing is a favorite sport, since they are very voracious and readily take any kind of animal bait, especially worms and flies. The color of the trout varies somewhat according to the condition of the water and the flesh ranges from white to pink, the latter being most highly prized. Several species attain a large size. Specimens weighing from 25 to 40 pounds are not rare.

Trovatore, IL (*trō-vā-tō'rā, èl*), four-act opera by Giuseppe Verdi which, together with the master's "La Traviata" and "Rigoletto," was

most influential in establishing his fame throughout the world. First produced in Rome, Italy, in 1853, it was heard on the American stage for the first time in 1855.

Trowbridge (*trō'brīj*), JOHN TOWNSEND, novelist and juvenile writer, born in Ogden, N.Y., Sept. 18, 1827; died in Arlington, Mass., Feb. 12, 1916. He attended local public schools and, for one year, the academy at Lockport, N.Y. He taught in public schools of Illinois and New York from 1845-47 and then moved to New York City, where he began to publish stories in the *Dollar Magazine*. In Boston, a year later, he became publisher and editor of the *Yankee Nation* and associate editor of the *American Sentinel*. He wrote a number of pieces for the newly founded *Atlantic Monthly* and became a regular contributor to *Our Young Folks* and *St. Nicholas*. He acted as consultant editor (1865-70) and managing editor (1870-73) of the *Youth's Companion*. He was twice married and had five children. Among his good friends were Longfellow and Oliver Wendell Holmes.

Apart from "Neighbor Jackwood" (1857), one of the first realistic novels of the period, the greater and most outstanding part of Trowbridge's literary production (some 40 volumes) consists of adventure tales and stories for boys. These stories had a wide popularity among teenage boys and rank with the best of their kind. He also wrote verse, and a collected edition of his "Poetical Works" was published in 1903. An autobiography, "My Own Story," also appeared in 1903.

Some of Trowbridge's better-known juvenile writings are "The Tide-Mill," the "Toby Trafford," and the "Jack Hazard" series.

Troy (*trōi*), or *ILIUM*, a famous city of Asia Minor. It is celebrated as the seat of the Trojan War, the chief events of which are recounted in the "Iliad" of Homer. The ancient city is supposed to have occupied an imposing site in the northwestern part of Asia Minor, near the Aegean Sea and the western extremity of the Hellespont. We learn from the "Iliad" that the city was situated at the foot of Mt. Ida and that between it and the sea was the plain of Troy, a stretch of land about 9 m. wide. It is believed that the plain referred to is a slope of land lying near the mouth of the Menderes River, now supposed to be the Scamander of Homer. Schliemann made excavations in this vicinity and discovered remains of a prehistoric city, believed to be those of the ancient Troy.

Homer relates that Troy reached its greatest splendor in the reign of King Priam. Its destruction was caused by Paris, a son of Priam, who abducted Helen, the wife of Menelaus, King of Sparta, and carried her off to the Trojan capital. The Greeks spent 10 years in collecting an army

to avenge this outrage, and, under the leadership of Agamemnon, who had 1,186 ships and 100,000 men, drove the Trojans within the walls of Troy, where they conducted a siege for 10 years. A quarrel between Achilles and Agamemnon proved disastrous to the Greeks in the beginning of the 10th year, and this is the special subject of the "Iliad."

It is related that the Greeks were unable to capture the city by direct assault. Hence, they constructed a huge wooden horse, within which they concealed a band of the bravest Greek heroes. The Greeks left this structure before the gates of Troy, withdrew from the city, and the army and navy sailed to an island near the coast called Tenedos. The city broke into rejoicing at the apparent departure of the Greeks, and it was proposed that the wooden horse be drawn within the walls. However, Laocoön warned the Trojans not to bring any device made by the Greeks into the city and while speaking cast his spear against the wooden horse. Soon a monstrous serpent rose from the sea and devoured Laocoön and his sons, thus leading the people to believe that destruction had visited his home because he had cast his spear against an object sacred to Minerva. They accordingly brought the horse within the gates by means of ropes and rollers, but at night a secret door was opened and the brave band of Greeks concealed within, aided by the Greek army, returned from the island, captured and destroyed the city. It is thought that this event occurred in 1184 B.C. Among the bravest Greeks who took part in the memorable siege were Achilles, Agamemnon, Ajax, Ulysses, Menelaus, Diomedes, Nestor, and Patroclus. The celebrated Trojans included Hector, Sarpedon, and Aeneas. It is supposed that Aeolic Greeks founded a city on the site of Troy in 700 B.C.

Troy, county seat of Pike County, Alabama, 45 m. S.E. of Montgomery. It is on the Central of Georgia and the Atlantic Coast Line R.R.'s and has a large shipping trade in livestock, cotton, and peanuts. Manufactures include textiles, doors and sashes, and fertilizers. Troy is the seat of a state teachers college. The town was settled in 1824 and incorporated in 1843. Population, 1940, 7,055; 1950, 8,555.

Troy, a city of New York, seat of Rensselaer County, on the east bank of the Hudson River, 8 m. N.E. of Albany, N.Y. It covers a corporate area of 9.8 sq. m. and is served by the New York Central and other railroads. The Albany Municipal Airport is 9 m. from downtown Troy.

Troy's landmarks include the Wendell-Lansing house, built about 1750 in early Georgian colonial style; the Watervliet Arsenal (built in 1813), 1 m. W. of Troy across the Hudson River; and the Samuel Wilson Monument. Institutions of higher learning include Rensselaer Polytech-



Courtesy The Troy Record

AIR VIEW OF TROY, NEW YORK

nic Inst., the oldest college for engineering in America, opened in 1824; Russell Sage Coll.; and Hudson Valley Technical Inst.

The city is located at the head of Hudson River tidal navigation and includes the eastern terminus of the New York State Barge Canal, with extensive terminal facilities for canal traffic. The principal manufactures include clothing (especially shirts), valves, fire hydrants, paints and varnishes, scientific instruments, steel, brake linings, paper boxes, and garden implements. Troy is a shopping center for an estimated 231,000 urban, suburban, and rural residents.

The site of Troy was included in a grant of land given in 1629 to Kiliaen van Rensselaer by the Dutch West India Co. Settlement began in 1786, and the name Troy was adopted in 1789. It became the county seat in 1793, was incorporated as a village in 1798, and was chartered as a city in 1816. Troy's Samuel Wilson, who supplied beef to the U.S. Army in the War of 1812 and whose barrels of beef were stamped "U.S.," came to be known as Uncle Sam (*q.v.*). Since 1816 the city has been governed by a mayor and a board of aldermen. Population rose from 28,785 in 1850 to 60,651 in 1900, to 72,311 in 1950, and to 76,300 in 1958 (estimated).

Troy, county seat of Miami County, Ohio, on the Great Miami River, 65 m. w. of Columbus. Troy is served by the New York Central and the Baltimore & Ohio R.R.'s and is the marketing center of a rich farming and stock-raising region. Manufactures include airplanes, dishwashers, grinders, slicers, furniture, gummed paper, prefabricated houses, air compressors, and tobacco products. Troy was settled in 1807 and incorporated in 1814. Population, 1940, 9,697; 1950, 10,661.

Troyes (*trwä*), a city of France, capital of the department of Aube, on the Seine River, 92 m. s.e. of Paris. It is an important industrial center, with manufactures of hosiery, textiles, gloves, soap, and paper. The city contains a number of medieval houses and churches, including the church of St.-Martin, begun in 1262; the cathedral of St.-Pierre, built between the 13th and

TRUCK

16th centuries, which has famous stained-glass windows; and the 14th-century church of St.-Jean. Troyes dates back to pre-Roman times. In the 4th century it became an episcopal see and in the 11th century the capital of the province of Champagne. The counts of Champagne established here two annual trade fairs, at which merchandise from all over the known world was exchanged, and which were of great commercial importance, setting standards of weights and measures for the rest of Europe. The city was occupied by German troops and suffered considerable damage in World War II. Population, 1954, 58,605.

Troy Weight (*troi wät*), a scale of weights used for weighing silver, gold, and jewelry, so named from Troyes in France. See *Weights and Measures*.

Truce of God (*trōōs ūv göd*), in the Middle Ages, an attempt made by the Church to limit private warfare. First proposed in France, in 989, the truce prohibited hostilities, under penalty of excommunication, from Thursday evening to Sunday evening of each week, as well as on certain feast days and during the entire seasons of Advent and Lent. Later it was extended from Wednesday evening to Monday morning, and violators of it were denied the right of sanctuary. Within a century the truce of God had spread to Italy, Germany, Flanders, and England. At the Council of Reims (1119), Pope Calixtus II renewed the truce and declared that violators of it should be deprived of Christian burial, unless they made satisfaction. Later in the 12th century, as the power of kings increased and strong centralized governments developed, the truce of God gradually became an ineffective device.

Trucial Oman (*trōō'shql ō-man'*), a region of eastern Arabia, extending almost 400 m. along the southern coast of the Persian Gulf from the peninsula of Qatar to Cape Musandam. The adjective trucial refers to the series of truces made in the 19th century with Great Britain by the sheiks who ruled the region's seven constituent petty states. The sheiks agreed to suppress piracy and the slave trade and to trade only with Great Britain. The area of the region has not been defined exactly; its capital is Sharjah (population, ca. 5,000), which also houses the headquarters of a British resident agent. Population, ca. 80,000.

Truck (*trūk*), a wheeled vehicle used for the transportation of goods; modern usage tends to limit the word to a motor-driven van usually larger than a passenger automobile. Articles carried range from livestock, beer, or clothing to oil and gasoline. Goods are stored in the section of the truck behind the driver, in an open or, more generally, closed compartment. There are numer-

TRUCK FARMING

ous special trucks having such helpful devices as skids, cranes, platforms, etc., which offer means of loading and unloading with a minimum of manual labor. Modern streamlined trucks, often with very large motors and bodies and tremendous capacities for carrying, have become indispensable transport aids for factories, mills, warehouses, and shipping docks, as well as for smaller individual needs.

The industrial truck, which replaced the horse-drawn wagon, may be said to date from 1906, when Tracy V. Buckwalter, of the Pennsylvania R.R., conceived the idea of powering a hand baggage truck for the purpose of transporting luggage in the New York terminal. It was not, however, until World War I that development of trucks really prospered. Competing with the railroads in freight transportation, the truck industry has grown rapidly.

In 1957 the private and commercial trucks in the U.S. moved more than 240,000,000,000 ton-miles of freight. In the preceding year, the Bureau of Public Roads reported, there were 10,625,536 trucks registered in the U.S.

Truck Farming (*trūk fārm'ing*), one of the more highly specialized developments of American agriculture (*q.v.*). It has evolved from the typical farm or home garden into one of the major commercial systems of farming upon which not only the housewife but large segments of the nation's industrial, transportation, and commercial activities now depend. Commercial truck crops are grown in some sections of this country each month in the year. Because these crops are extremely perishable, the harvested product must be handled rapidly with specialized methods in order that the consumer may obtain them in a fresh condition. To meet these requirements for the protection of the value of the truck crops has required the development of approximately 200 different types of containers; the production of approximately 300,000,000 packages annually; the invention of special food machinery for grading and packing; the use of large parts of our supply of railroad refrigerator cars; and the development of a vast system of wholesale and retail distributive facilities. Associated with the growth of truck farming has been the development of specialized farm machinery, fertilizer industries, processing facilities for canning, quick-freezing, and dehydrating vegetables, motor-truck distribution facilities, and recently, some use of air transportation.

Truck farming operations are intricate and complex. Nationally, the structure includes large-scale farm operations characteristic of California, Texas, and Florida, from which large quantities of vegetables are shipped long distances in refrigerator cars to the centers of population; smaller and more conveniently situated truck-farming areas



Photo by Pace, courtesy U. S. Dept. of Agriculture

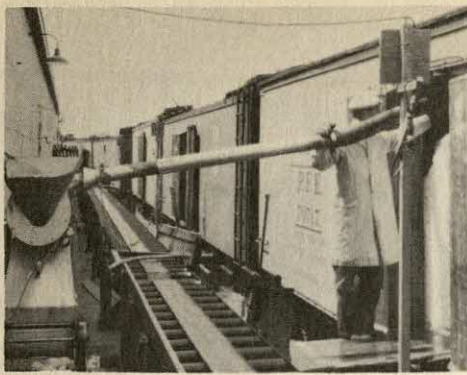
HARVESTING CELERY ON A TRUCK FARM

The celery has been cut from its roots, undesirable ribs stripped from the stalk and the stalk tops have been trimmed before being packed into crates

from which shipments by rail and motor truck are limited to a comparatively few states; market-garden areas located in the immediate vicinity of metropolitan areas; and the production of certain "out-of-season" vegetables in greenhouses. In addition, certain areas specialize in the production of plants suitable for shipping to various truck-farming areas for transplanting.

Frequently on individual commercial truck farms two or more crops are produced on the same land in a single year. Climatic or other conditions also may permit the production of two crops of the same vegetable during the same year.

In each commercial area extensive preparation must precede the actual production in order to prepare the soil properly for planting, and preparation also must be made for the marketing of the product. In preparing for vegetable production, the farmer must purchase seed, fertilizers, fungicides, and insecticides, and make machinery purchases and repairs. Arrangements must be made for packaging and for distribution outlets. During the production season, various farming and marketing service operations are necessary, including seeding or transplanting, frequent cultivation, weeding, irrigation, application of fertilizers, application of fungicides and insecticides, harvesting, grading, packing, precooling, loading, and icing for shipment. Meanwhile, careful study of market prices and distribution is necessary. The production of truck crops involves large labor requirements, and includes consider-



Courtesy U. S. Dept. of Agriculture

SHIPMENT OF TRUCK FARM PRODUCTS

Cars loaded with lettuce are refrigerated with crushed ice blown over the shipment by a mechanical loader

able risk in production, market acceptability, and prices.

The rapid rate of growth and quick maturity of most vegetables and their widespread distribution tend to cause their market prices to fluctuate with production conditions in the various producing areas. Price and cost relationships, rapid growth and uncertainty of weather conditions, the danger of insect and disease damage, and the inherent tenderness and perishability of most vegetables tend to make this type of farming one of the most economically hazardous in agriculture.

PRODUCTION AND CONSUMPTION. The acreage of commercial truck crops, excluding potatoes and sweet potatoes, has increased almost continuously since 1929. The acreage for fresh use increased from 1,400,000 in 1929 to 1,822,680 in 1950, with a high point of 2,047,490 in 1946, while the acreage for processing increased from 1,200,000 in 1929 to 1,626,450 in 1950, with a high point of 2,064,190 acres in 1946. Production has shown an upward trend but the changes from year to year have been somewhat irregular due to variations in yield. From 1929 to 1950, however, production for fresh use increased from 6,000,000 tons to 9,039,000 tons, with a high point of 9,072,700 tons in 1946, with production for processing increased from 3,000,000 tons to 5,320,800 tons, with a high point of 6,314,760 in 1946. These figures do not include the acreage or production in market garden areas, in farm or home gardens, or that produced in greenhouses.

The production for fresh use in market garden areas and in greenhouses has been variously estimated as from about 60 per cent to about 80 per cent of the above figures, while the production on farm gardens is about equal to that produced in the market garden areas. The total U.S. production of truck crops for fresh use may very well approximate two and one-half times that shown above for fresh use.

TRUCK FARMING

Table 1 provides a comparison of the 1950 commercial truck crop acreage harvested and the value of such crops with comparable data for corn, wheat, cotton, and tobacco. The value of the commercial vegetable production in 1950 was about

TABLE 1. COMPARISON OF ACREAGE AND VALUE OF COMMERCIAL TRUCK CROPS¹ WITH CERTAIN OTHER CROPS, 1950

| Crop | 1950 Acreage ² | 1950 Value ³ |
|------------------------|------------------------------|----------------------------|
| | (1000 acres) | (million dollars) |
| Commercial truck crops | 3,723 | 837 |
| For fresh use | 1,843 | 624 |
| For processing | 1,880 | 213 |
| Corn | 83,302 | 4,962 |
| Wheat | 61,741 | 2,055 |
| Cotton (lint and seed) | 17,850 | 2,356 |
| Tobacco | 1,604 | 1,049 |

¹ Excluding market-garden areas, potatoes and sweet potatoes.

² Harvested acreage.

³ Value is for crop year and should not be confused with calendar year income.

three-fourths of the value of tobacco, one-third of the value of cotton lint and seed production, one-fourth of the value of wheat production, and one-seventh of the value of the corn production. This relationship has been fairly constant for a number of years.

The apparent annual consumption of fresh vegetables averaged approximately 230 lbs. per capita between 1929 and 1943. The trend in per capita consumption, however, has been upward for more than 30 years; for example, for the five-year period 1910-14 the estimated average annual per capita consumption was 189 lbs., but for the five-year period 1945-49 the comparable per capita consumption was 260, an increase of about 70 lbs. per capita over the 35-year period. During the same period, there occurred a similar reduction in the consumption of potatoes (including sweet potatoes). This increase in per capita consumption of vegetables (other than potatoes and sweet potatoes) occurred largely among vegetables other than cabbage, onions, tomatoes, and melons, among which crops only a nominal consumption increase was noted.

During the same period, the estimated annual consumption of commercially canned vegetables increased from an average of 17.6 lbs. per capita to 40.9 lbs. per capita, or an increase of about 23.3 lbs. per capita over the 35-year period. Frozen and dehydrated vegetable consumption is small, but the consumption of frozen vegetables rose from about one pound per capita in 1942 to more than three pounds in 1949. The total annual consumption of vegetables, fresh and processed, averages about 300 lbs. per capita.

PRODUCTION COST AND LABOR REQUIREMENTS. Vegetable production is among the most expensive of all agricultural enterprises primarily be-

TRUCK FARMING

TRUFFLE

cause of the large labor and fertilizer requirements. Among the different vegetable crops costs range widely, varying with the quantities of labor and fertilizers required, and with variations in yields, wage rates, and prices for other materials and supplies.

Table 2 provides some examples of labor requirements for producing certain truck crops for specified periods and areas.

There are few months of the year in which major truck crops are not available to consumers. The U.S. Department of Agriculture reports of carlot shipments show that of the 28 vegetables reported, other than potatoes and sweet potatoes, 16 are available during each calendar month, three others during at least nine months of the year, and seven others during at least six months of the year. The wide range of temperatures and the network of marketing and transportation

capita consumption of calories protein, fat, and carbohydrates.

Trudeau (*trōō'dō*), EDWARD LIVINGSTON, physician, born in New York City, Oct. 5, 1848; died at Saranac Lake, N.Y., Nov. 15, 1915. He studied at Columbia Coll. and the Coll. of Physicians and Surgeons, in New York, and practiced for a brief time in his native city. In 1873, he took up his residence in the Adirondack Mts., at Saranac Lake, where he founded (1884-85) the Adirondack Cottage Sanitarium for the treatment of tuberculosis. He was the first American to employ the open-air method in treating this disease and was singularly successful in effecting cures. He published many valuable articles on this treatment in medical publications, as well as his "Autobiography."

True (*trōō*), ALFRED CHARLES, educator, born in Middletown, Conn., June 5, 1853; died Apr.

TABLE 2. SOME EXAMPLES OF LABOR REQUIREMENTS IN PRODUCING SPECIFIED VEGETABLES IN PARTICULAR AREAS AND YEARS¹

| ITEM | Per Acre Man Hours Labor (hours) | YIELD PER ACRE | |
|--|---|----------------|------------------|
| | | No. | Unit |
| Beets, New York, 1929 | 274 | 570 | bushel |
| Beets, South Carolina, 1932 | 73 | 1.5 | tons |
| Carrots, Imperial County, California, 1933 | 48.9 | 350 | crates (75 lbs.) |
| Cauliflower, Monterey County, California, 1933 | 47.3 | 300 | dozen heads |
| Celery, San Joaquin Valley, California, 1933 | 268.3 | 125 | crates |
| Celery, Seminole County, Florida, 1926 | 732.4 | 642 | crates |
| Lettuce, Salt River Valley, Arizona, 1927 | — | 132 | crates |
| Lettuce, Imperial County, California, 1933 | 49.4 | 150 | crates |
| Spinach, Genesee County, New York, 1928 | 39 | 286 | pounds |
| Spinach, Western New York, 1927-29 average | 48 | 470 | pounds |
| Spinach, Sumter County, South Carolina, 1932 | 97 | 1.6 | tons |
| Squash, Sumter County, South Carolina, 1930 | 82 | 94 | hampers |

¹ These data are not comparable because of variations in the degree of mechanization of farms, different years for which the data apply, and the fact that the yield data may not be representative. The data are included for illustrative purposes only.

facilities throughout the nation combine to permit this.

Expansion in the production of commercial truck crops has occurred for each of the four seasons, but production has expanded at a much greater rate during the winter season. Consequently, consumers in the northern sections of the country are afforded an array of fresh vegetables during out-of-season production periods for those sections. According to recent Commercial Truck Crop reports, about 17 per cent of the nation's commercial vegetable production is harvested during the winter, 23 per cent in the spring, 42 per cent in the summer, and 18 per cent in the fall.

NUTRITIVE VALUE. Vegetables are important in the American diet because they are the major source of supply of vitamin A and ascorbic acid. They are secondary sources of all other nutrients, and provide 2 per cent or less of the average per

23, 1929. After attending the public schools, he entered Wesleyan Univ., and was graduated in 1873. He was a professor at Wesleyan Univ. from 1884-88. In the latter year he accepted a position in the U.S. Department of Agriculture and continued to serve with the department until 1929. In 1902 True became dean of the first graduate school of agriculture in the U.S., at Columbus, O. He was known as one of the leading students of agricultural education and research in America. Editor of the *Experiment Station Record* for 10 years, he published a number of books on agricultural research and education.

Truffle (*trūf'l*), a genus (*Tuber*) of edible fungi. The plants are subterranean, without visible roots or stems, and grow from the size of an acorn to that of a large potato. They are found usually near the roots of various deciduous trees, especially oaks. Truffles are cultivated in Europe, especially in the southern part. They are used in

many dishes, both for their mushroom-like flavor and their nutritious qualities. Since no stem or other visible growth appears above the surface, the plants are found through the agency of dogs or pigs that are trained to hunt them by means of the scent. While some truffles have been found in the U.S., they are not common.

Trujillo (*trōō-hē'yō*), a seaport city of Honduras, capital of the department of Colón, situated on the northern coast about 58 m. N.E. of Tegucigalpa. The city has a large trade in such tropical exports as fruits, rubber, hides, and mahogany and other woods. Population, 1950, 3,200.

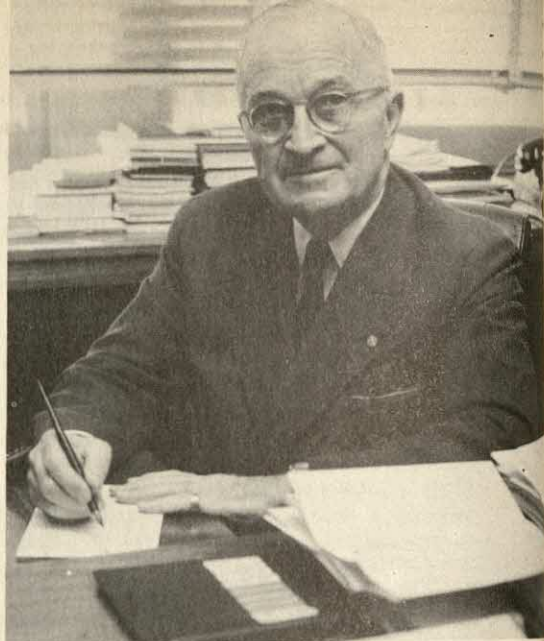
Trujillo, city of Peru, capital of the department of La Libertad, situated on the northern coast about 9 m. from the port of Salaverry, and 315 m. N.W. of Lima. The city is an important commercial center and is the site of a cathedral, the national university, and a theological seminary. Population, 1948, 45,899.

Trujillo, a manufacturing town of Spain, situated in Cáceres province, about 25 m. E. of the city of Cáceres. The principal products include chinaware, pottery, and leather goods. Population, ca. 13,000.

Truk (*trōōk* or *trūk*), a group of small volcanic islands, about 50 sq. m. in area, in the central Caroline group in the western Pacific Ocean about 2,800 m. S.E. of Tokyo and 5,100 m. N.E. of Perth, Australia. The chief islands lie within a lagoon about 38 m. in diameter, encircled by a reef whose four passes afford access to several fine anchorages. Major islands include Dublon, Moen, Tol, Udot, Fefan, and Uman; there are five other major islands and many islets. The chief city, Truk, is on the southeastern coast of Dublon Isl.

Mandated to the Japanese after World War I, they were strongly fortified in defiance of treaty obligations, and were used by them as a naval base during World War II. Despite repeated Allied attacks (Dec. 16, 1943 to Sept. 2, 1945), the Japanese defenders resisted occupation, forcing the Allies to "by-pass" Truk in their advance towards Tokyo. The islands were finally occupied on V-J Day, Sept. 2, 1945. Population, ca. 17,000.

Truman (*trōō'man*), HARRY S., 33rd President of the U.S., born in Lamar, Mo., May 8, 1884. Work in a bank and on the family farm preceded his active service in the U.S. Army during World War I. He gained a captaincy, and, after the war, became a major and later a colonel in the Field Artillery Reserve. Upon his return to Missouri he grew interested in law and politics. Elected judge of the county court at Jackson, Mo. (an administrative rather than a judicial position), he later studied law in Kansas City (1923-25), and, in 1926, became presiding judge of the Jackson County court, a post to which he was



HARRY S. TRUMAN

International News Photo

re-elected in 1930. During this time he was instrumental in obtaining many improvements in public buildings and highways.

In 1934, he was elected U.S. Senator from Missouri, chiefly by the Democratic machine of Tom Pendergast. Re-elected in 1940, Senator Truman distinguished himself as head of the so-called Truman Committee, a special Senate investigating committee on the national defense program. In its reports on the various agencies, their expenditures, efforts, and achievements, the Truman Committee brought to light cases of waste of funds, food waste in army camps, poor investment of government funds and labor, defective materials used in production, etc. The result of its careful checking was to save the government many millions of dollars. In 1944, Sen. Truman was elected to the office of Vice President on the Democratic ticket and on President F. D. Roosevelt's death, April 12, 1945, took the oath of office as President.

President Truman addressed Congress for the first time on Apr. 16, 1945, pledging to continue President Roosevelt's domestic and foreign policy. However, in spite of a bipartisan promise of cooperation, he was unable to maintain two-party harmony in Congress. He met with both Republican and Democratic, primarily Southern, opposition in almost every domestic move. In the course of reorganization, the Roosevelt cabinet was finally replaced by the end of 1946.

Among the highlights of his first administration were his fight for the continuation of price controls, in which he was deserted by Congress; his attempts to avert major strikes, the strong moves he undertook to end the railroad stoppages of the postwar period, and the threats of coal

miners' strikes. However, he vetoed the Taft-Hartley Labor Law because of its restrictions on labor unions. The Republican victory in the 1946 Congressional elections increased tension between the White House and Congress over domestic policy. In his "whistle-stop" campaign of 1948 President Truman defended his policies and proposals for a national health and civil rights program "to strengthen the moral leadership of the U.S." so successfully that he won the Presidency in a multi-cornered race. Belying most political predictions, Truman defeated his Republican opponent, Thomas E. Dewey (*q.v.*), Gov. of New York, by 303 to 189 electoral votes. The 39 electoral votes, however, of five Southern states were cast for the States' Rights Democratic candidate, James Strom Thurmond (S.C.); and the candidacy of Henry Wallace (*q.v.*) also cost Truman popular votes. Although the Truman victory returned a Democratic majority to Congress, the White House-Capitol Hill relationship did not improve measurably and almost all his campaign promises were repudiated by Congress.

In the field of foreign policy, Congress largely supported President Truman. Under the leadership of the late Arthur Vandenberg (*q.v.*), Republican Senator from Michigan, a bipartisan foreign policy was developed which entailed enactment of such important measures for strengthening the defense of the Western democracies as the Truman Doctrine in 1947 (the active support of any country menaced by, and willing to oppose, Communist encroachment), the European Recovery Program (1948), and the North Atlantic Pact (1949). To counteract the Communist aggression in Korea (*q.v.*) Truman organized collective action in the U.N. and immediately dispatched U.S. forces to the front. His Asiatic policy especially toward China (*q.v.*) was strongly criticized, however, and his relieving of Gen. Douglas MacArthur (*q.v.*) from the latter's duties as Far Eastern Commander (1951) as a result of his disagreement with Washington's policy in Asia, further strained Truman's relationship with Congress; it even, for a while, endangered his position within his own party. The successful conclusion (September 1951) of a peace treaty with Japan and the creation of a Pacific defense zone with Australia, New Zealand, and the Philippines (against possible Communist aggression) found the Congress in agreement with Truman's view that "It must be the policy of the United States to support free peoples who are resisting attempted subjugation by armed minorities or by outside pressures."

However, incidents such as the publication of William Hillman's book, "Mr. President" (1952), a collection of Truman's private papers compiled "for the historical record" frequently chastising leaders of both parties, and the seizure

(Spring 1952, later declared unconstitutional by the Supreme Court) of the steel industry during a labor-management dispute continued to disturb the President's relations with Congress and with business and political leaders. Truman did not seek re-election in 1952, and after President Eisenhower's inauguration resumed private life in Independence, Mo. Since his retirement he has frequently commented on U.S. and international affairs and has published his "Memoirs," in two volumes (1955-56).

Trumbull (*trūm'būl*), JOHN, painter, born in Lebanon, Conn., June 6, 1756; died in New York City, Nov. 10, 1843. After initial study of painting in Boston, he went to England, to study under the famous Benjamin West (*q.v.*) in London. After a short time, however, he was imprisoned there (1780) as an American officer (he had resigned his commission previously), and was deported. Later (1784) he resumed his studies with West, in whose studios he created his famous "Battle of Bunker Hill." Trumbull served as secretary to John Jay in London (1793) and was one of the commissioners appointed to carry out the provisions of the Jay Treaty (1794-1803).

As a painter, he was attracted by historical scenes from the beginning, and aside from his portraits of men like Washington, Clinton, and Hamilton, the great historical pictures have become most famous. Noteworthy among them are "The Signing of the Declaration of Independence," "Death of Montgomery," "The Surrender of Burgoyne," and "Sortie from Gibraltar." Although his subject matter was very near to that of his master, Benjamin West, Trumbull's huge canvases seem like illustrations of patriotic events rather than great works of historic narration.

Trumbull, JONATHAN, jurist and statesman, born in Lebanon, Conn., Oct. 12, 1710; died there Aug. 17, 1785. In 1727, he was graduated from Harvard Univ., and subsequently took up law. He was chief justice of Connecticut from 1766 to 1769 and governor of the colony from 1769 to 1783. He was one of the earliest among the colonial governors to espouse the American cause, refusing to obligate himself by oath to enforce the Stamp Act, and was a trusted supporter and confidential adviser of Washington. There was long a legend that Washington's familiar addressing him as *Brother Jonathan* gave rise to the subsequent use of that term as equivalent to the people of the U.S.; but this is unsubstantiated. For portrait of Trumbull, see next page.

Trumpet (*trūmp'ēt*), a wind musical instrument which dates from remote antiquity, distinguished for its clear and penetrating tone. It is formed of a single tube of brass or silver curved into a convenient shape, having a mouthpiece at one end and a bell at the other. Most modern instruments of this class are provided



JONATHAN TRUMBULL

After a painting by John Trumbull

with crooks and slides, thus raising or lowering the pitch as the tube is shortened or lengthened, respectively. The sounds are modified by the action of the player's lips and may be varied by the addition of slides, valves, and keys.

Trumpet Flower (*trump'et flou'ēr*), an evergreen high-climbing shrub (*Bignonia capreolata*), in the bignonia family, or the flower of such a plant. Also called the cross-vine, the plant has funnel-shaped, yellowish-red flowers about 2 in. long. The plant climbs by means of tendrils one



TRUMPETER OF THE 17TH CENTURY

TRUSTS

of which is attached to each leaf. Its narrow flat seed-pods are about 7 in. long. The name trumpet flower is also loosely applied to many plants with trumpet-shaped flowers, especially two other vines in the bignonia family. These plants, the trumpet vine (*Campsis radicans*), native to the southern U.S., and the trumpet creeper (*C. grandiflora*), native to China, are not evergreens, however, and climb by means of small roots which grow along their stems.

Trustee (*trūs-tē'*), the term applied to a person to whom is entrusted the right to hold certain property, either real or personal, for the benefit of another, or for some special purpose. Any one who has an interest in property so held, whether the interest be exclusive or limited, is termed a beneficiary. It is not obligatory upon any one to assume the responsibility of a trust, but if he undertakes such a duty it must be discharged until a full settlement is made, or he is released upon the order of a court or an agreement of the beneficiaries. Trusts can be *express trusts* in which all details are stated in a will or similar document, or they can be *constructive trusts* in which the details are handled through a court in light of the known intentions of the creator of the trust. Most states make breach of trusts a crime punishable by law, and in all cases the trustee is liable for the misapplication of funds or the consequences of a breach of trust. If several trustees act conjointly in the administration of a trust, each is liable only for his own acts. See *Trusts*.

Trust Indenture Act (*trūst in-dēn'tūr ākt*). See *Securities and Exchange Commission*.

Trusts (*trūsts*), combinations of corporations or of individuals, which are maintained to fix the prices of their products, in part at least, on the principle of monopoly. The term *corporation* is applied to the combination of individuals which is maintained for productive and commercial purposes, but trusts are by no means confined to corporations. However, it may be said that trusts are an outgrowth of associations which seek to control large interests in promoting commerce and industry. Besides the primary object of trusts to diminish the cost of production, they seek to affect the market by limiting the output as well as to make the prices favorable to the parties who constitute the combination. Those who promote the organization and maintenance of trusts defend them from the industrial point of view that free and open competition is ruinous in its nature, especially where intercourse between persons in different localities is easily carried on and where a large amount of capital is invested in fixed plants. They also argue that there is a material saving industrially where combinations are maintained, and claim that the competitive system tends to lessen the quality of the product as well

as to require the investment of larger sums of money to produce a reasonably fair output.

In the U.S., the impact of the industrial revolution following the Civil War promoted and encouraged the phenomenon of trusts in an era noted for "rugged individualism." The term "trust" originated in the title of the Standard Oil Trust, formed (1882) by the stockholders of various oil refineries in Pennsylvania and Ohio, who assigned their stock shares to nine trustees in order to receive dividends from the pooled profits of the different plants in the combine. This arrangement allowed unproductive plants to be dismantled without material loss to the holders of stock certificates issued by the trustees. In 1887 the leading whiskey distillers organized similar trusts, and the principal manufacturers of other commodities followed suit. Public opinion, which had not been sufficiently aroused, found its champion in the state courts. In 1890, the Sugar Trust was dissolved by the New York courts; two years later the Standard Oil Trust was broken up by the state of Ohio.

The Interstate Commerce Act of 1887, enacted by Congress under its power to regulate interstate commerce, aimed at preventing unlawful discrimination in rates by common carriers engaged in interstate commerce. This type of discrimination had in a large degree encouraged trusts. An Interstate Commerce Commission (*q.v.*) was set up by the Federal government to administer the act. Its powers have been systematically enlarged to plug the legal loopholes discovered by the trusts in their fight against Federal control.

The Sherman Anti-Trust Law of 1890, designed to protect interstate and international trade, held to be illegal all contracts, combinations, trusts, and conspiracies in restraint of interstate or international commerce. Persons participating in such illegal agreements were made subject to penalties for violation of the act, and the Attorney General could enjoin all acts violating the statute and dissolve all contracts made in its violation. The Sherman Act does not apply to monopolies created and authorized by a state. In order to complement the Sherman Act, the Clayton Law and the Federal Trade Commission Act were passed in 1914.

Kansas, Maine, and Michigan enacted anti-trust laws as early as 1889, and at present over 30 states have anti-trust laws. In Ohio and Missouri, the anti-monopolistic statutes contain sweeping power; in the latter state, persons or corporations convicted of fostering illegal trusts cannot use the state court to collect debts. In 1906, the U.S. circuit court at St. Louis, Mo., brought suit against the Standard Oil Co. and ordered it to dissolve. The Supreme Court of the U.S. upheld this decision in 1911, but the form

of dissolution effected by Standard Oil did little to break up the trust and rendered serious competition in the oil industry impossible. New Jersey, which has long been favorable to large corporations with monopolistic tendencies, passed seven laws in 1913 friendly to such enterprises. As a result, the Standard Oil Co. of New Jersey, as well as the U.S. Steel Corp. and other large networks of industry, have found in New Jersey a haven against interference.

The creation of the Federal Trade Commission in 1914 was a direct outcome of the pioneer Bureau of Corporations, which went into operations 10 years earlier. The Federal Trade Commission Act provided for (1) a Federal Trade Commission of five members appointed for seven years at an annual salary of \$10,000 each; (2) the condemnation of unfair competition on the part of industrial combinations; (3) the taking of action against unfair practices where their existence had been proven; (4) the extension of the commission's power over corporations engaged in interstate commerce, with the exception of banks and common carriers; (5) the submission to the commission of annual corporation reports and other information requested; (6) investigation as to the way in which previous decrees of the commission had been carried out by industrial combination; (7) investigation, at the request of Congress or the President, of alleged violations of the anti-trust acts, and recommendation of changes needed to bring practices into line with the act; (8) recommendation, upon request of the Federal court, as to what form the court's decrees should take. The Federal Trade Commission Act exists to *prevent* unfair competition rather than to *punish* it.

The Clayton Act (1) prohibits local price discriminations, holding companies, tying contracts, and interlocking directorates; (2) states the remedies to be applied; and (3) defines the position which labor was to occupy under it. It was definitely declared in the act that all laws relating to combinations were not to apply to combinations of labor.

Because foreign nations did not forbid combinations either for domestic or foreign trade, the Webb-Pomerene Act of 1918 permitted American exporters to combine for the purposes of foreign trade provided they filed annual reports with the Federal Trade Commission regarding the character of their enterprises.

The period following World War I saw the rise of trusts in the U.S. In 1935, according to Internal Revenue figures, over 50 per cent of all net corporate incomes were earned by less than 1/10 of one per cent of the corporations reporting, and 84 per cent of the aggregate corporate net profits were earned by less than 4 per cent of the corporations reporting.

In the administration of President F.D. Roosevelt, stricter action was taken against trusts. In 1938, the Attorney General defined the policy of the Anti-Trust Division of the Dept. of Justice: "(1) as a guide for businessmen who seek information on the probable action of the department in like circumstances; (2) to aid the Dept. of Justice in formulating consistent anti-trust law enforcement; (3) to serve as a warning to those engaged in similar practices; (4) to call the attention of Congress to the interpretation and application of anti-trust laws." Criminal action began to take the place of negotiation. The codes of the National Recovery Act (NRA) sought to promote the policy of self-regulation in industry and were specifically exempted from prosecution under the anti-trust laws. To all appearances, the NRA seemed to foster monopolistic tendencies in big business, but its excesses were offset by the freedom and encouragement it gave to unions of wage-earners. When large corporations began to take too much privilege, however, Congress appointed a Temporary National Economic Committee in June 1936 to investigate the activities of American corporate enterprise and by its inquiries into concentrated economic power to prepare the way for prosecution of conspiracies against the anti-trust laws. The trend toward public ownership of utilities was given an impetus by the Public Utility Act of 1935, which extended the authority of the Federal Power Commission to regulate all companies transmitting power across state lines. The Securities and Exchange Commission tightened its control over the private utility companies, restricting them to single integrated public utility systems. The Revenue Act of 1936, which met with strong opposition, attempted to impose special taxes on undistributed corporate profits and on all gains realized through the transfer of capital assets, but the rates were considerably reduced in 1938. The Robinson-Patman Chain Store Act, passed in 1936, sought to protect small business and retailers against the crushing competition of large chains.

Anti-trust legislation has in recent years shown a tendency to regulate rather than to destroy trusts. Inevitably, anti-trust laws have not kept pace with the trust activities of big business, and must undergo thorough revision before they become effective instruments of social control.

Tsad (*chād*), a variant of CHAD or French, TCHAD, a fresh-water lake located in central Africa at the junction of the Chad and Niger republics and at the northeast boundary of Nigeria. The lake is ca. 850 m. above sea level. The Shari River and a few other streams pour into it, but the lake has no outlet. In geological times the Tsad was a very great body of water, but it has gradually grown smaller. During the

rainy season, when the lake receives the rain waters and the Shari pours its floodwaters into it, the area covered is ca. 10,000 sq. m. During the dry season, the area decreases, often to 5,000 sq. m., losing its water through evaporation and percolation. The depth ranges from 3 ft. to ca. 15 ft. There are two principal groups of islands, the Kuri and Buduma, in the lake, and the surrounding area is brush-covered sand hills and low-lying marshlands. It is thought that the Tsad was known to the ancient Greeks. European explorers discovered it in the 19th century.

Tsad or CHAD (French, TCHAD), REPUBLIC OF, a former overseas territory of France, which, under the French Fifth Republic, became a self-governing republic within the French Community in 1958. See *French Equatorial Africa*.

Tschaikovsky (*tchī-kōf'skŭ*), PETER ILYITCH. See *Tchaikovsky*.

Tsetse (*tset'sē*), a small blood-sucking fly of South Africa, slightly larger than the gadfly. The color is brown with yellow transverse bars on the abdomen, beyond which the wings project considerably. It is an active insect, especially in the warmer part of the day, and can scarcely be caught by the hand. The bite is as harmful to man as it is to the mule and the wild animals native to the country, and it is decidedly poisonous to oxen, horses, and dogs. No harmful effect is perceived at first, but in a few days the nose and eyes begin to run. This symptom is followed by swelling of the lower jaw, staggering, relaxation of the muscles, and finally death. Some of the animals bitten linger in an affected condition for several months and sometimes recover. Although formerly numerous the fly has been partially exterminated through the use of new insecticides such as D.D.T.

Tsinan (*jē'nān*), or CHINAN, capital of the province of Shantung, China, 3 m. s. of the Yellow River and about 250 m. s. of Peking. The city is a textile-manufacturing center and a railroad junction. There are iron mines nearby. At one time, a major medical-training center, Shantung Christian Univ., was maintained in Tsinan. A dispute over the Tsingtao-Tsinan railway, built by Germany, captured by Japan, and sold by Japan to China under the terms of the Shantung Treaty (1922), led to an "incident" between Japan and Chinese Nationalist troops, May 3-4, 1928. In 1938, the city fell to the Japanese invaders, but was recaptured by the Allies in 1945. Population, ca. 475,000.

Tsingtao (*ching-dou'*), a seaport in China, located on the southern coast of Shantung Peninsula, on Kiaochow Bay off the Yellow Sea. It is connected by rail with Tsinan. It is an industrial city, with a deep-water harbor on Kiaochow Bay. Tsingtao Univ. and a government

marine biological laboratory are located here. Tsingtao was the major city of the German-leased territory of Kiaochow (1898-1914). As such, it was a shipping center and was equipped with drydocks. The 117-sq.-m. Kiaochow territory was seized by the Japanese during World War I to prevent its use by German naval forces. Returned to China in 1922, the city was again occupied by the Japanese in 1937-45. Population, *ca.* 1,000,000.

Tuaregs (*tū'ā'rēgz*), a nomadic people of the Sahara Desert, closely allied to the Berbers. They inhabit the Sahara from Fezzan west to the Atlantic. The hair is straight, the physique is well developed, and the features resemble those of the Caucasian rather than the African. In religion they are Mohammedan and they are fanatic and warlike. Formerly they were monogamists, but became polygamists after adopting the Moslem faith. The women go unveiled and take part in public affairs. These people number about 300,000.

Tubal-Cain (*tūb'āl-kān'*), in the Old Testament, one of the sons of Lamech (Genesis 4:22). Tubal-Cain is said to have been the first metalworker.

Tuberculosis (*tū-bēr-kū-lō'sis*), an infectious disease caused in man by the human tubercle bacillus, a bacillus of the mycobacterium class, which may infect various tissues or organs of the body. The lungs are especially liable to infection, resulting in pulmonary tuberculosis. The disease may also spread to the blood and lymphatic systems, the spleen, kidney, liver, intestines, brain, etc. Prior to 1882, when Dr. Robert Koch (*q.v.*) discovered the *tubercle bacillus*, tuberculosis was thought to be hereditary. Dr. Koch proved that it was caused by the small germ, which is transmitted from infected persons to others. It is now known that tuberculosis is not inherited. Human beings have a natural resistance to tuberculosis. This resistance, however, may be broken down by constant exposure to the disease, and by living conditions which lower the vitality of the body generally, such as poor nutrition or excessive physical or mental stress and strain.

Pulmonary tuberculosis often has no apparent symptoms in its early stage. Seemingly healthy people may be infected without realizing they are ill, and may infect other people with their germs. The first symptoms are unusual tiredness, loss of appetite, loss of weight, pain in the chest, and a slight rise in temperature—ordinarily in the afternoon. These symptoms become more pronounced as the disease progresses; there may also be other symptoms, such as indigestion, a cough with expectoration, hoarseness, and blood spitting.

Although tuberculosis has no apparent symptoms at first, it can be discovered in its early stage by means of chest x-rays. In addition a thorough

physical examination is necessary, as well as sputum and other laboratory tests.

Treatment should always be under medical supervision. Climate is no longer considered important in the treatment of tuberculosis. Prolonged exposure to the ultraviolet rays of sunlight is dangerous to the patient with pulmonary tuberculosis. Ultraviolet lamps, which can be regulated as to dosage and time of exposure, may sometimes be prescribed. Bed rest may be supplemented by surgery in some cases. Surgery ranges from pneumothorax (*q.v.*), to thoracoplasty, an operation in which the ribs over the diseased area are removed to bring about permanent collapse of the lung, and lobectomy and pneumonectomy, in which, respectively, a section or the whole lung is removed.

Tuberculin, which was also discovered by Robert Koch (*q.v.*), is used in tests to determine the presence of tubercle bacilli in the body, but it is not a preventive or a cure.

Tuberculosis was the 15th highest cause of death in the U.S. in 1959.

Tuberose (*tūb'rōz*), an ornamental bulbous plant, native to tropical America and Asia, cultivated in gardens for its fragrant white flowers. The branchless stem grows from a bulbous root, usually 2 to 4 ft. high, and bears sword-shaped leaves. The flowers are beautiful and their pure white color and enduring fragrance make them highly esteemed. Perfumers cultivate tuberose in Italy, France, and Switzerland. The plant is propagated by tubers, which appear at the bottom of the scape. Numerous species have been obtained by propagation. They are left outdoors in mild climates, but in cold countries the tuberous rootstalks are taken up and stored in a dry and frost-proof place. In most species the stem grows to a height of 2 to 3 ft., the flowers appearing at the upper part, while clusters of leaves are borne at the lower part.

Tübingen (*tū'bing-en*), a celebrated university city of Germany, in Württemberg, 20 m. s.w. of Stuttgart. It is on the Neckar River, at the border of the Black Forest (Schwarzwald), and may be reached by railway. Duke Eberhard founded the famous university in 1477, and it soon became a distinguished seat of learning. In 1534 the university adopted the reformed faith, added a Protestant theological seminary in 1536, and provided a Roman Catholic theological faculty in 1817. A powerful influence has been exercised by the Univ. of Tübingen on the religious and scientific thought of Europe. Among its eminent teachers were Melancthon, Reuchlin, and Baur. During World War II Allied troops captured the city (1945). After the war the city was included in the French Zone of Occupation. Population, *ca.* 30,000.

Tubman (*tūb'mən*), HARRIET, abolitionist, born in Dorchester County, Md., *ca.* 1821; died in Auburn, N.Y., March 10, 1913. She worked as a field hand from her early teens until she escaped from slavery about 1849. Soon after, she became one of the leading figures in the Underground Railroad (*q.v.*). She spoke at antislavery meetings and was a friend of leading abolitionists. During the Civil War she served with Union forces in South Carolina as a laundress, cook, nurse, guide, and spy behind Confederate lines.

Tuckahoe (*tūk'a-hō*), the common name of a peculiar vegetable growth found in the southern U.S., called also *Indian leaf* and *Indian bread*. Its development is not well understood. It usually forms large masses, often several inches in diameter, upon old roots; it has been classed as a spurious fungus growth. The exterior is barklike and the interior is of a whitish compact formation. Like the European truffle, it grows only under the surface. It is unfit to eat, but it has some use as a medicine.

Tucson (*tōō-sōn'*), a city in Arizona, seat of Pima County, located in the valley of the Santa Cruz River, 65 m. n. of the Mexican border. At an altitude of 2,400 ft., Tucson is surrounded by mountains—the Catalina Mts. to the north and the Tucson Mts. to the west. The metropolitan area, with a population of 220,000, stretches far

ular winter resort. Among the landmarks are the 18th-century Jesuit mission, San Xavier del Bac; the Arizona-Sonora Desert Museum of Natural History; and the Saguaro National Monument. An annual rodeo and a horse-drawn parade are held in February. In addition to tourism, the industries include cattle raising and copper mining, as well as some light industry and defense plants. Tucson is the center of a standard metropolitan statistical area (pop., 1960, 265,660) including all of Pima County; it had a value added by manufacture of \$19,403,000 in 1958. The public schools have an annual enrollment of more than 32,000. Tucson is the seat of the Univ. of Arizona; their Laboratory of Tree Ring Research and its Carbon 14 Age Determination Laboratory are noteworthy. Davis-Monthan Air Force Base is 8 m. e. of here.

The Indian name Tucson was first recorded by a Jesuit missionary, Father Eusebio F. Kino, who visited the Santa Cruz Valley in 1698, but the present town was founded by Father Francisco T. Garcés, a Franciscan, in 1776. With the independence of Mexico from Spain, Tucson became a Mexican village, which was transferred to the U.S. in 1853 as a result of the Gadsden Purchase (see *Gadsden, James*). Tucson was the capital of the Arizona Territory in 1867-77, was incorporated as a town in 1877, and received a city charter in 1883. The city government consists of a mayor, council, and city manager. From 1850 to 1870 the population increased from 300 to 3,000; in 1900, it was 7,531. The decade of greatest growth was from 1950, with a population of 45,454, to 1960, when it was 212,892.

Tucumán (*tōō-kōō-mān'*), a city in Argentina, capital of the province of Tucumán, on a tributary of the Dulce River. It is situated in the center of a large agricultural area, producing sugar, corn, alfalfa, and rice. The city is the site of sugar refineries, alcohol distilleries, and grain mills. Manufactures include citrus extracts, frozen meats, and dairy products. Tucumán Univ. is located here. Founded in 1565, and established on its present site some 20 years later, Tucumán was the seat of the first congress of the republic, in 1816, which proclaimed the independence of Argentina. Population, 1953 (est.), 235,038.

Tudela (*tōō-THā'lā*), a city in northern Spain, on the Ebro River, *ca.* 50 m. s. of Pamplona. The city is situated in a stock-raising district and has sawmills and a timber trade. The 12th-century Collegiate Church of Santa Maria and an old Roman bridge are the principal landmarks. The French won an important military victory near Tudela in 1808 and occupied the town until 1813. Population, 1957, 13,740.

Tudor (*tū'dēr*), a dynasty of England. It was of Welsh extraction and occupied the throne of England from 1485 until 1603. Owen Tudor



MISSION SAN XAVIER DEL BAC

This old Spanish mission at Tucson, Ariz., is in daily use as a church for Papago Indians

into the foothills, and the city proper covers an area of 23.83 sq. m. Tucson is served by the Southern Pacific R.R. and is also the northern terminus of the Southern Pacific of Mexico. Tucson Municipal Airport is located 7½ m. s. of the city.

Tucson's warm, sunny climate makes it a pop-

(died 1461), the founder of the family, was made a squire at the court of Henry V because of his bravery in the battle of Agincourt. He later married Catherine of Valois, the widow of Henry V. Of their five children, Edmund, the eldest son, was created earl of Richmond by his half-brother, Henry VI, in 1453. Edmund married Margaret Beaufort, who was descended from John of Gaunt (*q.v.*), and their son became the first Tudor king, Henry VII (*q.v.*), of England. By his marriage to Elizabeth, daughter of Edward IV, Henry united the claims of the houses of Lancaster and York (*qq.v.*) to the throne, thus marking an end to the Wars of the Roses (see *Roses, Wars of the*). The four Tudor sovereigns who succeeded Henry VII are Henry VIII, his son Edward VI, and his daughters Mary I and Elizabeth I (*qq.v.*). When Elizabeth died without issue in 1603, the Tudor dynasty was followed by that of the house of Stuart (*q.v.*).

Tudor Style (*tū'dēr stīl*), in architecture, a term covering the last phase of the Gothic style in England, flourishing from 1485 to 1558. Its exterior characteristics are ornate oriel or bay windows, numerous chimneys of unusual design, high pinnacled gables, and patterned brickwork combined with half-timber. Lavish wood paneling and plaster reliefs used as wall and ceiling ornamentation are interior characteristics.

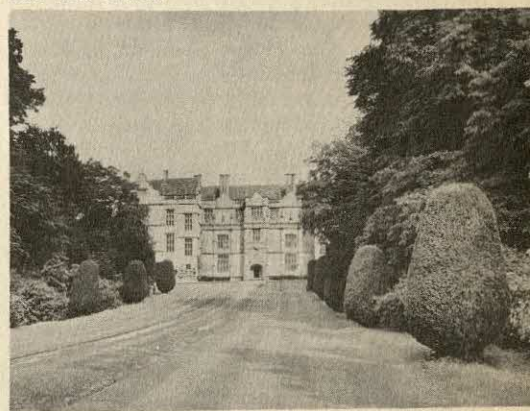
Tuesday (*tūz'dē*), the third day of the week, so named from Tiw, or Tyr, the son of Odin, the Scandinavian god of war. In the Roman calendar it is called *Dies Martis*, from Mars. Shrove Tuesday (see *Shrove-tide*) occurs immediately before Lent.

Tufa (*tōō'fā*), in geology, a porous rock formed by the action of springs or streams. The term is usually applied to calcareous deposits.

Tufts University (*tūfts*), a coeducational institution of higher learning in Medford and Boston, Mass. Founded in 1852, it was named for Charles Tufts, farmer and brick manufacturer (1781-1876), who donated the land on which the Medford campus is located. The undergraduate colleges are Tufts Coll. (men), comprising liberal arts and engineering schools; Jackson Coll. (women); and the Coll. of Special Studies. There are graduate schools of arts and sciences, medicine, and dental medicine (at Boston); the Crane Theological School; and the Fletcher School of Law and Diplomacy. Tufts also sponsors Naval and Air Force R.O.T.C. units and conducts an annual eight-week summer session. Total annual student enrollment is *ca.* 4,000. The faculty totals about 1,000. The university plant and endowment are valued at \$30,000,000, and the libraries contain over 270,000 volumes.

Tu Fu (*dōō fōō*), Chinese poet, born in Shensi province, China, *ca.* 713; died in Hu Huang, *ca.* 770. Although his verses and essays won great

acclaim when he was 15 years old, Tu Fu failed to gain acclaim in later life and lived for the most part a nomadic, poverty-stricken existence. He held several minor official posts, during the T'ang dynasty, only to be dismissed after brief terms. His poems, considered among the greatest ever written in Chinese, are of a beautiful lyric quality, rich in imagery, and descriptive of nature and events.



TUDOR STYLE

Montacute House in Somersetshire, England. Built in 1600 by Sir Edward Phelps, a Speaker of the House of Commons, it is one of the finest examples of British architecture of that time

Tugwell (*tūg'wēl*), REXFORD GUY, educator and public official, born in Sinclairville, N.Y., July 10, 1891. He was educated at the Univ. of Pennsylvania and later taught economics there, at the Univ. of Washington, and at Columbia Univ. Tugwell was one of the first members of the so-called Brain Trust, consulted by President F. D. Roosevelt in the formulation of the New Deal, and he served with the Dept. of Agriculture (1933-37). In 1941 he was named chancellor of the Univ. of Puerto Rico. He was governor of the island (1941-46), but he resigned to teach political science at the Univ. of Chicago. He retired from this post in 1957. He is the author of "The Economic Basis of Public Interest" (1922), "The Stricken Land" (1946), "The Democratic Roosevelt" (1957), and many other papers and books.

Tuileries (*twe'lēr-ēz*), the name of a palace in Paris, France, on the site of the Tuileries gardens (designed by André Le Nôtre in the 17th century). It is located between the Louvre and the Place de la Concorde. At the time of its purchase by Francis I, the land was occupied by tile kilns (in French, *tuileries*). The construction of the palace, planned by Philibert Delorme, was begun by Catherine de Medici in 1564. The structure was later enlarged by Henry IV and Louis XIV. It was the scene of many events connected with

the French Revolution (*q.v.*), and, on Aug. 10, 1792, a Paris mob stormed the Tuileries, which afterward served as the seat of the Convention. Again in 1830 and 1848, the palace was taken by the people. In 1871 it was completely destroyed by the Commune of Paris (*q.v.*).

Tula (*tōō'lā*), a city in Russia, capital of Tula, region of the Russian Soviet Federated Socialist Republics, on the Upa River, 118 m. s. of Moscow. The region has an area of 11,960 sq. m., and lies in the fertile "Black Soil" belt of Russia, watered by the Don and Oka Rivers. The town, which dates from the 11th century, is located in a rich iron-mining region. Among the manufactures are cutlery, bell metal, edged tools, brushes, cordage, soap, leather, clothing, firearms, and machinery. The large cannon factory was founded by Peter the Great, and has continued to be an important source of supplies for the Russian Army. In World War II, German armies were stopped just short of Tula in their invasion of Russia in 1941-42. Population of the city, *ca.* 272,500; of the region, *ca.* 2,050,000.

Tulagi (*tōō-lā'gē*). See *World War II* (War in the Pacific).

Tulane University (*tōō-lān' ū-nī-vēr'sī-tī*), an institution of higher learning at New Orleans, La., established by the state legislature in 1834. It was known as the Univ. of Louisiana until 1884, when it received a bequest of \$1,050,000 from Paul Tulane (1801-87), and at that time the name was changed to Tulane Univ. of Louisiana. About the same time Josephine Louisa Newcomb of New York made a gift of \$100,000 for the education of white girls and young women, with which fund the H. Sophie Newcomb Memorial Coll. was erected. It has a productive endowment fund of over \$6,960,000. The university property has a value of \$4,100,000. The courses include medicine, arts and sciences, law, engineering, commerce and business administration, social work, and a graduate school. It has a library of 350,000 volumes. Near the grounds is the celebrated Audubon Park. The faculty includes 790 professors and instructors and the attendance is about 7,000.

Tularemia (*tōō-lā-rē'mī-ā*), or RABBIT FEVER, DEER FLY FEVER, an acute infectious disease caused by the bacterium *Pasteurella tularensis*. It is transmitted to man from animals such as wild rabbits, hares, woodchucks, coyotes, squirrels, foxes, and domestic animals, such as the dog, cat, and hog. Transmission occurs via the bite of the deer fly, horse fly, wood tick, rabbit tick, and bee. Tularemia is also contracted by handling, dressing, or eating the insufficiently cooked meat of infected wild animals. The common wild rabbit is the most frequent source in such cases.

The average period of incubation in man after contact with the infection is about three days.

Direct infection from man to man is very rare. All ages and both sexes are susceptible to tularemia, but the adult male is the most frequently affected. Human cases occur in all parts of the U.S. and many regions of Europe and Asia. One attack confers a permanent immunity.

The onset of tularemia is sudden, with a chill, headache, fever, vomiting, and general body aches and pains. The patient usually is prostrated and confined to bed, and weakness, weight loss, and sweats follow. The fever may be continuously high, or variable, with a proportionate increase in the pulse rate. Usually an ulcer forms at the site of initial infection in the skin. Then the regional lymph nodes become infected, enlarged, and painful, and either suppurate and erupt spontaneously, or require surgical drainage. Both the original ulcer and the affected lymph nodes heal very slowly. A skin rash may occur at any place on the body at any time while the fever is present. The fever lasts three or four weeks, and convalescence is slow.

Since tularemia may be confused with typhoid fever, undulant fever, tuberculosis, influenza (*q.v.*), and other diseases, definite diagnosis is usually made by means of a specific blood test which becomes positive in the second week, and also by special bacterial studies. Treatment is symptomatic, including bed rest, hot packs and analgesics for pain, and drainage of suppurating lymph nodes. Modern drugs are being used with good results. About five per cent of cases are fatal, due to overwhelming infection or complications of pneumonia, meningitis, or peritonitis. Prevention includes care in handling wild animals, especially rabbits, avoidance of insects, and thorough cooking of wild meat.

Tule (*tōō'lē*), any of several large bulrushes, certain species of *Scirpus* in the sedge family, growing in large numbers in wet places in the southwestern U.S. The plants have erect, leafless, green stems 3 to 9 ft. tall, each ending in a 1- to 5-inch-long head of small inconspicuous flowers. The plants spread by horizontal underground stems and often grow so abundantly along irrigation ditches that they interfere with the flow of the water and have to be dug out. The name tule is also used, less properly, for certain other marsh plants such as cattails (*Typha*).

Tulip (*tū'lip*), a plant known botanically as *Tulipa*, in the lily family, or the flower of such a plant. It consists of an underground bulb which stores food from year to year, long leaves at the ground and on the stem, and (usually) one large, showy cup-shaped flower upright at the tip of the stiff stem. The flowers occur in almost all colors except true blues. About 100 species of the genus *Tulipa* are native to Asia and the Mediterranean region, but the common garden varieties have been developed by centuries of

crossing and selection. Garden tulips may be divided into three blooming groups. The early single and double bloom early in April; the plants and flowers are generally smaller than the later ones and may be as low as 6 in. Midseason tulips bloom in May; the Cottage, Mendel, and Triumph varieties are up to 2 ft. tall. The late tulips bloom in late May; mostly Darwin tulips, they are large-flowered and 2 to 3 ft. tall. There are minor groups of tulips with various outstanding features. The Rembrandt, Bizarre, and Bybloem are variegated; the Parrot (or Dragon) tulips, fringed; the lily-flowered have recurved petals; and the multi-flowered have from 2 to 6 flowers on a stem. In general, tulips with solid colors are called breeders; those with streaks, broken tulips.

Tulip Tree (*tū'lip trē*), a tree (*Liriodendron tulipifera*) in the magnolia family, native to the eastern third of North America. It grows from 90 to 250 ft. tall and 6 to 14 ft. in diameter, with greenish-yellow flowers shaped somewhat like tulips. The leaves, 3 to 6 in. long and broad-based, narrow abruptly about the middle. An important timber tree, the tulip tree is one of the tallest and longest-lived of eastern hardwoods. Its wood, known as whitewood, or tulip or yellow poplar, is used for furniture, paneling, plywood, and musical instruments.

Tulsa (*tū'sā*), a city in northeastern Oklahoma, seat of Tulsa County, on the Arkansas River, 120 m. N.E. of Oklahoma City. It is served by the Missouri-Kansas-Texas R.R. and the St. Louis-San Francisco and the Atchison, Topeka and Santa Fe Rys. Tulsa Municipal Airport is 8 m. N.W. of the city. The area is a popular summer resort, centering around a number of large lakes. Sequoyah State Park is within easy reach to the southeast. The city is the seat of the Univ. of Tulsa, and its cultural facilities include the Philbrook Art Center.

The second-largest city in the state, Tulsa is the headquarters of many major oil companies and is one of the nation's major petroleum-refining centers—the hub of a vast network of pipelines carrying oil and natural gas to the eastern states. Other major industries include steel fabrication, aviation modification and maintenance, and the manufacture of oilfield equipment. In addition to petroleum, the surrounding area has important deposits of zinc, lead, gypsum, germanium, silica sand, and coal. It is also an important agricultural region, producing livestock, grains, hay, cotton, vegetables, fruits, and nuts. In 1958 the city had a value added by manufacture of \$139,363,000. It is the center of the Tulsa Standard Metropolitan Statistical Area (pop., 1960, 418,974), which includes all of Creek, Osage, and Tulsa counties (the area of the city overlaps the latter two.)

Tulsa was founded by a Creek Indian about 1836. White settlement began about 1880, and the city was incorporated in 1896. Its government is by a mayor and commission.

In 1900 Tulsa had a population of 1,390. Its growth began with the discovery of oil in 1901, and its decades of greatest increase were from 1920, when the population was 72,075, to 1930, when it was 141,258; and from 1950, when the population was 182,740, to 1960, when it was 261,685.

For illustration, see *Oklahoma*.

Tumbleweed (*tūm'b'l-wēd*), any plant that breaks off at the ground when its seeds are ripe, and rolls in the wind, scattering the seeds. Often the branches curve inward so that the plant forms a ball. Tumbleweeds are commonest on dry open plains in the western U.S. Some are native there, others are native to Europe and Asia. They are mostly annuals, and can be controlled by clean cultivation and hoeing before seeds are formed. Some of the common tumbleweeds are winged pigweed, tumbling pigweed, Russian thistle, and tumbling mustard.

Tumor (*tū'mēr*), in medicine, (1) a swelling, caused by inflammation or hemorrhage into a part of the body; (2) a new tissue growth occurring anywhere on or in the body, not caused by inflammation.

It is defined as a mass of cells, tissues, or organs resembling those normally present in the body, but irregularly or atypically arranged, which grow at the expense of the body, not serving any useful purpose. A *benign tumor* is one which remains localized and does not spread to other parts of the body. It does not recur after removal, and is relatively innocuous, except when it is of excessive size and causes discomfort or pain by pressure upon and interference with the function of adjoining structures. A *malignant tumor*, commonly called *cancer* (*q.v.*), is one which grows rapidly and spreads directly to adjoining tissues and organs, and, via the lymphatic system (*q.v.*) and blood stream, to more distant parts of the body. One or two small cancer cells may travel from the site of origin—for example, the prostate gland—and develop a new tumor in the brain, a bone, or a lung. It is thus obvious why any tumor suspected of being malignant should receive competent medical treatment (surgery, X-ray, radium) before metastasis (spreading) may occur.

Both benign and malignant tumors may arise from any tissue or organ of the body. The most common types of benign tumors are cysts (encapsulated cavities containing fluid, occurring in glandular structures); polyps (soft tumors which grow on a pedicle from mucous membranes such as in the nose, bladder, rectum, uterus, etc.); lipomas (fatty tumors which develop under the

skin); and myomas (fibroid muscle tumors, commonly found in the uterus). The most common malignant tumors are the *sarcomas*, arising from connective tissue (that tissue which connects skin to the underlying muscle, or muscle to bone, or which holds organs in place) and bone structures, and the *carcinomas*, arising from all structures containing epithelium (flat cells on a surface), such as the skin, any mucous membrane surface, or any glandular organ. The most common malignant tumors in the male arise in the lungs, the prostate gland, and the stomach and intestines, and in the female, in the breast and genital organs (uterus and ovaries).

The cause of cancer has long been a subject for conjecture and investigation. Among the most plausible suspected factors are: (1) *Congenital*—Certain small groups of embryonal cells which remain undifferentiated as the cell "rests" among normally developing tissue cells in the fetus and at some time later in life are suddenly stimulated to grow and multiply, pushing into and destroying other tissue. (2) *Chronic irritation*—such as cancer of the lip from long contact with cigarette or pipestem, cancer of the tongue from long abrasion by a broken and jagged tooth, and cancer of the skin from repeated contact with certain chemicals such as radium, tar, and soot. (3) *Heredity*—It is well known that cancer has tended to occur in certain family lines. Experience with breeding experiments on many generations of mice have shown that susceptibility to spontaneous cancer is inherited as a simple Mendelian recessive characteristic. (4) *Hormonal imbalance*—It has been shown that excessive administration of certain hormones internally to mice has produced cancer of the breast, and repeated direct application of hormonal substances to the skin has produced similar results. (5) *Virus theory*—Certain types of tumors have been transferred from one animal to another by injection of cell-free filtrates from the tumor tissue, indicating that a filtrable virus may be a cancer-producing agent. (6) *Age*—Cancer is largely a disease of middle and old age, when imbalance or derangement of cell metabolism and function become more common. Certain forms, however, are found chiefly in children. See also *Cancer*.

Tuna (*tōō'na*). See *Tunny*.

Tunbridge Wells (*tūn'brīj wēlz*), an English spa, in the county of Kent, 34 m. s.e. of London. Its chalybeate springs have attracted numerous persons since their discovery in 1606. William Thackeray sketched Tunbridge Wells in "The Virginians." Population, 1961, 39,855.

Tundra (*tōōn'drā*), a general name for a broad, treeless, swampy area. A tundra is usually a flattish or slightly convex bog found in northern regions where the subsoil is permanently frozen. When spring and summer thaws occur, the water

from melted snow stands for a long time, causing the formation of a wet, cold, and acid soil. Tundra conditions thus occur also on high, frozen mountains; an area in Rocky Mountain National Park is known as the Tundra Slopes. Hardy mosses and lichens are the only plants which thrive under such conditions; but ridges, better drained, occasionally permit the growth of dwarf shrubs. Mountain tundra, because of characteristically better drainage, is called "dry tundra" or "lichen tundra." The Tundra Belt, which circles the North Polar region, is probably the best remaining example of the type of vegetation that existed immediately after the glacial epoch.

This northernmost vegetative zone supports nomadic or semi-nomadic Lapps, Eskimos, and some Siberian tribes, for whom reindeer and caribou are the most valuable animals. Many of the lower animals can subsist on the tundra; wolves, foxes, Arctic hares, and some rodents thrive there. Bird life is particularly rich; many birds migrate to the edge of the tundra for the nesting season. During fall and winter, because of frozen surfaces, it is comparatively easy to move across the tundra; but in the spring and summer the vast swamps and great clouds of mosquitoes make such areas almost impassable. The Tundra Belt is widest in Siberia, but it also exists in northern Finland, Sweden, Norway, Greenland, Canada, and Alaska.

Tung (*tūng*), a Chinese tree cultivated for the oil of its nuts. It is grown commercially in the Southern states of the U.S. The oil is used for paints, varnishes, and as a waterproofing agent.

Tungsten (*tūng'stēn*), a metallic element (see *Atomic Weight*) closely related to uranium. It is found chiefly in the mineral wolframite (*q.v.*), a tungstate of iron and manganese. It occurs native with oxide of tin. Its color is steel-gray, and it can be melted only at white heat. It is hard, brittle, and crystalline. The chief use of this metal formerly was as a material for increasing the hardness and tenacity of steel. Since 1907 it has been widely used in electric lighting, mainly as a filament in lamps, completely displacing the earlier carbon filament.

Tungus (*tōōn-gōōz'*), a native race of Asia, found chiefly in the eastern part of Siberia. They inhabit the northern part of Sakhalin, whence they extend westward to the Yenesei River, and scattering settlements are found as far south as the country of the Manchus. They are chiefly a hunting and pastoral people and may be classed among the nomadic races of Asia.

Tunic (*tū'nīk*), a garment worn by the ancient Greeks and Romans. It reached to or below the knees, was confined to the waist by a girdle, and was made either with or without sleeves. In Rome the tunic was a common garment of both sexes and was worn under the *palla* and the *toga*.

TUNING FORK

Tuning Fork (*tūn'ing fórk*), in music, an instrument made of steel, used to present a pitch for the tuning of a musical instrument. The tuning fork has two prongs that spring from a handle, which serves as a sound post to transmit the vibrations of the fork. To set the fork in vibration, one of the prongs may be struck against any hard substance, or the prongs may be pressed together and then released quickly. A tuning fork may be made sharper by filing the ends of the prongs, or between them near the ends, and it may be made flatter by filing at or near the end. The tuning fork is generally tuned to C in the treble C clef, because organ builders start their tuning from that note.

In electronics, a tuning-fork resonator is an electronic frequency-generating device which represents a highly accurate method of producing fixed audio frequencies for the purposes of electro-mechanical timing and synchronization.

Tunis (*tū'nīs*), a city of North Africa, capital of the constitutional monarchy of Tunisia, on the Gulf of Tunis, an inlet from the Mediterranean. It occupies a site near the mouth of the Mejerdah River, about 9 m. from the ruins of ancient Carthage. The important structures include the palace of the bey, the Inst. of Higher Studies, and a number of mosques. The newer part of the city contains business and residential buildings. The city has several parks, and the harbor is commodious. Tunis has extensive railroad connections with the interior, making the city an important export and import market. Among the manufactures are olive oil, silk and woolen textiles, soap, leather, wax, tapestry, and clothing. About one-third of the inhabitants are Europeans. Population, *ca.* 400,000.

Tunisia (*tū-nīsh'i-à*), a republic in North Africa between the eastern and western basin of the Mediterranean Sea, which it borders in the N. and E.; to the W. it has a common frontier with Algeria, and to the S. it joins the Sahara and Libya. The area is 48,332 sq. m., divided into three main zones: Tell (north), steppes (center), desert (south), characterized by climate and vegetation. The principal physical features are the Tunisian Ridge and the Kroumirie Mts. (part of the Atlas Mts.). There is an over-all lack of rain and great fluctuation of rainfall from year to year. The 800-m. shoreline of shallow water abounds with fish.

TRANSPORTATION: There are *ca.* 9,000 m. of roads and 1,350 m. of railroads. Four modern ports, handling most of the exports and imports, are Tunis-La-Goulette, Sfax, Bizerte, and Sousse. Bizerte is a strategically important naval base. The international airport, El Aouina, is outside of Tunis.

ECONOMY: About 60 per cent of the population is engaged in agriculture, producing, for the most



Courtesy French Press & Information Service, N.Y.

TUNISIA. AN OASIS IN THE SAHARA DESERT

part, cereals, olive oil, and wine. Mineral potentials include large phosphate and iron deposits. Cereal growing has good yields in the north, where it is mechanized; in the center and south, traditional methods are still used. Livestock, the main resource of the seminomads in the center and south, includes sheep and goats. The mining output (phosphates and iron ore) represents about eight per cent of the national product. The use of electricity is spreading but is currently confined almost entirely to the north.

POPULATION: In 1956 the population consisted of an estimated 3,782,480, including nearly 3,500,000 Moslems, mostly Berbers with a strong Arab mixture. Almost the entire population speaks Arabic. Nearly 40 per cent of the population is urban, the southern desert being extremely sparsely inhabited. Because of the unusually high birth rate (40 to 45 per 1,000 inhabitants), over half the inhabitants are under 20 years old. The principal cities are Tunis (400,000), the capital, Sfax (65,000), Sousse (50,000), and Bizerte (45,000).

EDUCATION: The educational system includes traditional (Koranic), Franco-Arabic, and French schools. There are about 300,000 students (*ca.* 60 per cent of the total number of children of school age) in primary, secondary, technical, and higher education; the last comprises the Moslem Univ. (Zitouna) and the Inst. of Higher Studies in Tunis.

HISTORY: After the Phoenician conquest (1200 B.C.) and the foundation of Carthage, Tunisia suffered Roman (A.D. 40), Vandal (A.D. 400), Byzantine (500), Arab (647), Spanish (1555), and Turkish (1574) invasions and conquests. An independent state was set up in 1705 by Hussein Bey, the founder of the present dynasty. The deterioration of the country's financial situation in the 19th century led to European intervention in 1869 and finally, in 1881, to the establishment of

TUNNEL

a protectorate by France, under the treaty of Bardo. The heretofore absolute powers of the sovereign (the bey of Tunis) and of the premier were heavily restricted through direct administration by the French. Due to the activities of the Neo-Destour independence movement, internal autonomy was achieved in 1955. On March 20, 1956, the independence of Tunisia was proclaimed. It became a member of the U.N. on Nov. 12, 1956. A constitutional assembly was convened to prepare a constitution, with a government responsible to parliament, elected by universal suffrage—which was extended to women. Later (July 1957) Tunisia became a republic under Pres. Habib Bourguiba (former premier), and the sovereign Sidi Mohammed al-Amin was forced to resign. Economic and cultural relations with France were continued, but they were often strained by events taking place in other parts of Africa, *e.g.*, Algeria.

Tunnel (*tūn'el*), a passageway under the surface of the earth or its waterways, man-made for passage of people, vehicles, water, sewage, or other utilities. Tunnels date from remote antiquity. In the early history of tunnels, the work was done exclusively by hand, the rocks being broken either by sledges or by fire, but in modern times powerful explosives and elaborate machinery are utilized. The particular method used in tunneling depends chiefly upon the kind of materials to be excavated. To ascertain the character of such materials, borings are made and trial shafts are sunk from the surface. Shafts are afterward used in most tunneling for access and for ventilation, air pumps being provided to facilitate circulation. Tunnels pierced through solid rock may have sufficiently strong roofs, but others may require brick, stone, concrete, or steel roof arches or complete linings. Herodotus mentioned a tunnel on the island of Samos, 4,250 ft. long, which was utilized to provide passage through a mountain. Alexandria had tunnels to supply water from the Nile, and the Romans, Peruvians, and Mexicans carried water for long distances by aqueducts or underground passages.

Among the most noted European tunnels of modern times may be mentioned those of Simplon, St. Gothard, Arlberg, and Mont Cenis. The Mont Cenis tunnel is 8 m. long and the St. Gothard tunnel is over 9 m., both piercing the European Alps. The world's longest tunnel is in the U.S. and is the 85 m. Delaware Aqueduct, bringing Catskill Mt. water to New York City. Other noteworthy American tunnels include one at Port Huron, Mich., passing under the St. Clair River; the Pennsylvania R.R. tunnel under the Hudson River, connecting New Jersey with New York City; one in Chicago under Lake Michigan, bringing city water from a distance of several miles; and one under St. Louis, affording connection between the union station and the Eads Bridge



Courtesy Port of New York Authority

NORTH TUBE OF LINCOLN TUNNEL

across the Mississippi. The Carleton Tunnel near Turquoise Lake, Colo., was opened for traffic in 1893. It pierces the Rocky Mts. through solid gray granite. The length is 1.4 m.; height above sea level, 10,800 ft. The Cascade Tunnel, 7.79 m. long, on the line of the Great Northern R.R., between Berne and Scenic, Wash., is the longest railroad tunnel in America. The Moffat Tunnel, in Colorado, on the line of the Denver & Salt Lake R.R., was completed in 1928. The Holland Tunnel, completed in 1927 at a cost of \$50,000,000, passes under the Hudson River between New York City and New Jersey, a total length of 1.8 m. The Lincoln Tunnel (1.6 m.), completed in 1937, parallels the Holland Tunnel; a third tube was added to it in 1957, at a cost of *ca.* \$100,000,000. In 1950 a 1.7-m. tunnel under the East River was completed connecting the Battery in Manhattan and downtown Brooklyn.

The Holland and Lincoln and many other under-river crossings were shield-driven tunnels, built under compressed air in the soft soil that forms the river bottom. Other recent under-river vehicular tunnels, such as a \$155,000,000 Baltimore Harbor crossing completed in 1957, were built by the sunken-tube method. By this method, steel sections of tunnel are built, launched, and towed to the site like ships, to be sunk there on a prepared bed, joined together and covered over with soil. See also *Subway*.

Tunney (*tūn'y*), JAMES JOSEPH (GENE), pugilist, born in New York City, May 25, 1897. After becoming champion of the A.E.F. as a Marine during World War I, Tunney turned professional in 1919 and became light-heavyweight champion of the world in 1923. He defeated W. H. (Jack) Dempsey (*q.v.*) for the heavyweight championship in 1926 and retired undefeated in 1928. Tunney has retained a keen interest in physical fitness and directed the U.S. Navy's athletic and physical fitness program during World War II.

Tunny (*tūn'i*) or TUNA, a class (Thunnidae) of fish of the mackerel family, including a number of important species, all of which are valuable food fish. In the U.S., the name *tuna*, an American-Spanish word derived through the Spanish from the English *tunny*, is commonly applied to all species. The *great tunny*, which

ranges in size up to 10 ft. and in weight up to 1,000 lb., is found in all warm seas. The *albacore*, or *long-finned tunny*, is found in the Mediterranean Sea and off the coast of Western Europe; it ranges in length from 8 to 20 ft., large specimens weighing from 800 to 1,200 lb. These two species are the basis of the extensive Mediterranean tunny industry. The greater part of the commercial tunny catch is canned. The *common tunny*, or *horse mackerel*, is found off the Atlantic coast of North America. In the U.S., a species native to the Pacific coast and one found off the Florida coast are especially highly regarded as game fish.

Tup (*tüp*), the male of the sheep, also called ram.

Tupi (*tōo-pē'*), or **TUPIAN**, a group of tribes of South American Indians first found by European explorers on the Brazilian coast, although they probably originated in southern Matto Grosso and Paraguay, South America. The Tupi were farmers, fishermen, and hunters, and exhibited a well-organized tribal life as well as a high level of culture. Skilled canoeists and warriors, they were also excellent craftsmen. The language of these coastal Tupi, first adopted by the Jesuits who came to Brazil, has become a kind of jargon used in the Amazon valley.

Tupper (*tüp'ēr*), SIR CHARLES, Canadian statesman, born in Amherst, Nova Scotia, July 2, 1821; died Oct. 30, 1915. After attending the public schools of Nova Scotia, he studied medicine at Edinburgh, Scotland, and was granted a degree in 1843. He was a member of the executive council and provincial secretary of Nova Scotia from 1857-60, and in 1864 became prime minister, but retired from office when his province was united with the Canadian federation in 1867. In 1870 he was made a member of the privy council of the Dominion of Canada and in 1884 became high commissioner for Canada in London. For his services in negotiating the fisheries treaty with the U.S. in 1888, he was made a baronet. He retired from the high commissionership in 1896 and, returning to America, became premier of the Dominion, but was soon succeeded by Wilfrid Laurier. He was defeated in the election of 1900, and retired from public life.

Tupper, MARTIN FARQUHAR, inventor and author, born in London, England, July 17, 1810; died Nov. 29, 1889. He studied at Charterhouse, London, was graduated from Oxford Univ. in 1831, and in 1835 was admitted to the bar. He soon gave up that profession and turned to literary work. In 1845 he was admitted to the Royal Society. He made two visits to America, in 1851 and 1876. His best known work is "Proverbial Philosophy," which appeared in three series between 1838 and 1867. His inven-

tions include glass screw tops to bottles, safety horseshoes, and several others, but they were not of material success. He also wrote "Ballads for the Times," and "My Life as an Author."

Turanian (*tū-rā-ni-an*), a term applied to an extensive branch of the Eurasian languages. It was first used by the Persians, who called their own country Iran and the countries lying toward the north Turan; hence, the people of the latter became known as Turanians. Originally the term included all speech of Asiatic origin that is neither Aryan nor Semitic, but in later use it is practically synonymous with Ural-Altaic. In the wider sense it embraces the speech of the Bulgarians, Hungarians, Finns, and Lapps of Europe and the Turks or Tartars, Samoyeds, Tungus, Manchus, and Mongols of Asia or Asiatic origin. These widely separated peoples speak dialects less closely connected than the Aryan and Semitic groups. This circumstance has led many writers to classify some as distinct languages, as, for instance, the Manchurian and Mongol tongues. It is noteworthy that a wide difference exists in the state of civilization; customs, and industries pursued by the several branches. The Samoyeds of Northern Asia are the lowest in the scale and the peoples in Europe belonging to this class are the most advanced, as the Hungarians and Finns. Both of the latter have a language of considerable culture, with a literature embracing songs, theology, history, poetry, law, geography, and other writings. The term Turanian, in its more limited application, is confined to those peoples who inhabit the Ural and Altai Mt. ranges and the neighboring country.

Morphologically, these languages belong to the agglutinative order of speech. However, they differ from other languages so classified in the exclusive use of suffixes attached to the unmodified root and partly blended with it.

Turbine (*tūr-bin*), a prime mover (*q.v.*) which converts the movement of gases or liquids into rotary mechanical energy by use of a rotor mounted on bearings in a case. A turbine driven by water is known as a *hydraulic turbine* (see *Hydraulics*); a turbine driven by burning gases is known as a *gas turbine* (*q.v.*) or internal-combustion turbine. Turbines are classified according to the flow of working fluid and to the number of sets of blades through which the working fluid passes. When the working fluid impinges at a sharp angle to the shaft, the turbine is called an *impulse turbine*; when the fluid runs parallel or nearly parallel to the shaft, it is called an *axial flow* or (although incorrectly) *reaction turbine*. The axial flow turbine has its nozzles mounted on the rotor. When there is one moving set of blades (also known as buckets or vanes), the machine is a *single-stage turbine*. A

turbine with more than one set of blades moving in the same direction is a *multi-stage turbine*. When there are two wheels moving opposite each other, it is called an *opposed turbine*. See also *Turbine Generator*; *Turbo-Compressor*; *Steam Turbine*.

Turbine Generator (*túr'bin jěn'ér-à-tēr*), an engine consisting of an electric generator driven by a steam or mercury-vapor turbine. This device is the common means of producing electric power commercially. The generator may produce either direct or alternating current, but in the latter case a separate exciter generator is attached to the shaft to provide the direct current for the field coils of the alternating current generator. Turbine generator drives are also used for tugboats, ferryboats, ocean liners, and railroad locomotives. See *Steam Turbine*.

Turbo-Compressor (*túr'bô-kûm-prěs'ēr*), or TURBO-BLOWER, a rotary pump for air or other gases used to supply large amounts of compressed gas at low pressure. The turbo-compressor consists of a wheel rotating in a housing at high speeds and carrying blades or impellers which impart high speed to the gas. The rotary element may be driven by an electric motor, a steam turbine, or a gasoline engine. The turbo-compressor operates at high speed with little vibration.

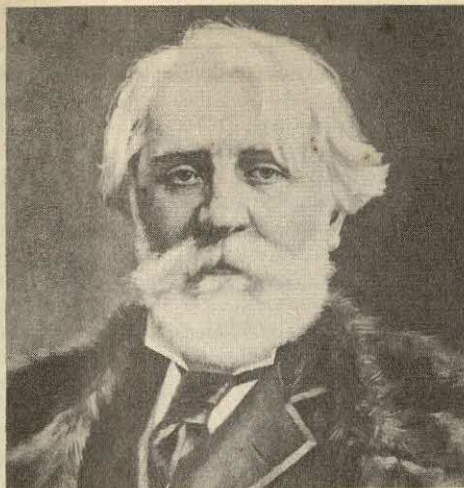
Turbot (*túr'bût*), a species of the flat-fishes, the most valuable of the genus. It is broad and scaleless and has conical tubercles on the upper side. The dorsal fin extends from the upper lip to the tail. Its eyes are on the left side, which has a brownish color, and the right or lower side is white. The *spotted turbot* found off the Atlantic coast of North America, sometimes called the plaice and the water flounder, weighs 15 to 25 lbs. It is about twice as long as it is wide. The *common turbot* found in the North Sea and other waters of Western Europe attains a weight of 60 to 90 lbs., but specimens weighing 180 lbs. have been caught. Like other flat-fishes, it swims near the bottom, the best turbot fisheries being near deep shores. The flesh is white and delicate and has been in high esteem from antiquity.

Turenne (*tû-rěn'*), HENRI DE LA TOUR D'AUVERGNE, COUNT OF, soldier, born in Sedan, France, Sept. 11, 1611; died July 27, 1675. He was the second son of Henry Bouillon, Prince of Sedan, and of Elizabeth, daughter of William the Silent, Stadtholder of Holland. In 1615 he was sent to Holland for military training under his uncle, Maurice of Nassau, who was then the most eminent soldier of Europe. He entered the army of France in 1630, serving in Germany and North Italy, and in 1642 was made a marshal and given command of the Rhine in the Thirty Years' War. The Bavarians under Gen. Mercy defeated

him at Marienthal, but in 1645 he won the famous Battle of Nordlingen, in which Mercy was slain. The civil wars of the Fronde followed, Turenne and Condé being on opposite sides, but the latter was defeated in a series of battles and was obliged to leave France after his defeat of the Dunes in 1658. Turenne was created marshal general of the armies of France by Louis XIV.

When France and Spain again took up arms, in 1667, he invaded Holland with a French army, but was compelled to retire because the Dutch cut their dikes and flooded the country. In 1672 he invaded Westphalia to attack Montecuccoli, the Austrian general who had succeeded the Elector of Brandenburg in command of the imperial army. He devastated a large part of the Palatinate and met his opponent in battle at Salzbach on July 27, 1675, but was killed by a bullet while leading his troops to the attack. Turenne was educated as a Protestant, but Bossuet influenced him to become a Catholic in 1668.

Turgenev (*tōor-gyá'nyef*), IVAN SERGEYEVICH, novelist, born in Orel, Russia, Nov. 9, 1818; died in Bougival, France, Sept. 3, 1883. His family moved to Moscow in 1828, where he studied at the university and subsequently studied in St. Petersburg and in Berlin, Germany. He returned to Russia from Berlin in 1841, devoting his time largely to literary contributions to several periodicals, and for some time held a government position at St. Petersburg. One of his first writings, "A Sportsman's Sketches," was a great success, written in favor of the peasants and against serfdom. For his being liberal and progressive in advocating civil reforms he was imprisoned and afterward banished, but in 1854 regained his freedom in Russia. In 1863 he moved to Baden, Germany, where he had a great friendship with the famous singer Mme. Pauline Viardot-Garcia; in 1871, he moved to Bougival near Paris, and remained in France most of the time until his death. Turgenev was probably the first among the great Russian writers who had won—already during his lifetime—international acclaim; he was in close contact with such French novelists as Flaubert and Zola and did much for spreading the knowledge of Russian literature. He wrote in Russian, German, and French, but his works have been widely translated into English and other languages. His complete works were first published in 1883 in 10 volumes. In his great novels—e.g., "A Nest of Gentle Folk," "Dimitri Rudin," "Fathers and Sons"—he gives an excellent depiction of the Russian society as well as of the peasantry from 1830 through about 1870, reflecting the social development from the reaction under Czar Nicholas I through the growing Nihilistic



Courtesy Gramstorff Bros., Malden, Mass.

IVAN TURGENEV

tendencies. In his many shorter stories—e.g., “Asya,” “First Love,” “The Backwater”—he proves his great gift in characterizing his main figures psychologically, especially in his female figures, and all this in harmony with delicate descriptions of the environmental landscape, moods, etc.

Turgot (*túr-gō'*), ANNE ROBERT JACQUES, BARON DE L'AULNE, statesman and economist, born in Paris, France, May 10, 1727; died there Mar. 18, 1781. Turgot attended the Lycée Louis-le-Grand and entered the seminary of St. Sulpice to study for the church. He was admitted to the Sorbonne in 1749, and honored by election to the office of prior. During this period he wrote two famous dissertations in Latin: “On the Benefits Which the Christian Religion Has Conferred on Mankind” and “On the Historical Progress of the Human Mind.”

Ultimately, he decided not to enter the church and, in 1752, was given several judicial appointments. Meanwhile, he continued his studies of literature and various branches of science. He frequented several of the salons of the period, was well acquainted with the encyclopedists, Diderot and D'Alembert, and with Voltaire, who became his friend, and was influenced by the physiocratic doctrines of François Quesnay and De Gournay. He wrote five excellent articles for “La Grande Encyclopédie” (1752-72).

In 1761, Turgot was appointed intendant of the generality of Limoges. During his 13-year term of office, he did much to improve the wretched conditions of this region. After the famine of 1770-71, he opened welfare bureaus to relieve public suffering. He also wrote on taxation, on the lending of money at interest, on mines and quarries, and advocated free trade in grains and protested against government re-



Courtesy Brown Bros., N. Y.

A.R. JACQUES TURGOT

strictions on agriculture and on trade in general.

To this period also belongs his outstanding treatise on political economy, “Reflections on the Formation and Distribution of Wealth” (1766), nine years before Adam Smith’s “Wealth of Nations.” After discussing the historical development of commerce, he restated Quesnay’s theory that land is the source of all wealth and elaborated his theories on the nature and functions of money. He distinguished three classes of society: landowners, agricultural producers, and wage-earning artisans, and asserted his belief in a single tax to be levied on the net produce of the land. Like Adam Smith, he demanded unrestricted commerce and industry; however, Turgot’s system was based on an agricultural rather than an industrial economy.

In 1774, he was appointed comptroller general of finances. He immediately drafted a letter to Louis XVI setting forth the aims of his administration: no bankruptcy, no tax increases, and no borrowing. He prepared a regular budget, abolished many useless government positions, and instituted free trade in grains. In 1776, he presented a six-point program to the Council of State, designed chiefly to suppress the *corvée* and the privileges of the trade guilds. The program was approved by the government; however, the nobility, the clergy, the financiers, and the rich bourgeoisie would all have been placed at a disadvantage by Turgot’s program. The other ministers thought his measures too precipitate, and he finally (1776) was obliged to resign his office. After his retirement, he devoted himself to literary and scientific studies. He became vice president of the Académie des Inscriptions in 1777.

Turin (*túr'in*) or TORINO, a city in northern Italy, capital of the province of the same name,



Photo by B. Holmes, courtesy Ewing Galloway, N. Y.

TURIN. SAN CARLO PLAZA

in Piedmont, on the Po River, 75 m. s.w. of Milan. Toward the west are the foothills of the Alps, including Mont La Superga (2,210 ft.), a popular resort. It is an important rail center and highway hub, and the Caselle airport is north of the city. Turin is one of the leading industrial cities of Italy. Its principal manufactures are automobiles (in which it ranks first among Italian cities), railroad rolling stock, silk and other fabrics, chemicals, rubber, machinery, iron and steel products, leather, paper, candy, and vermouth. Publishing also is important.

Turin is a city of great beauty, having large squares devoted to notable works of sculpture. Among its churches are the 15th-century Cathedral of San Giovanni Battista (1492-98) and the Basilica of Superga on the nearby mount, burial place of the House of Savoy. It is the site of such historic palaces as the Madama Palace, erected by William of Montferrat in the 13th century; the Royal Palace (17th century), housing a noteworthy collection of weapons; and the Carignano Palace (1680), site of the proclamation of the kingdom of Italy and seat of the first Italian parliament. The Antonelliana Castle, the highest stone building in Europe (510 ft.), is a museum dedicated to Victor Emmanuel II and the unification of Italy. The Palatine Gate is a relic of Roman times. The Univ. of Turin, founded (1405) by Louis of Savoy, is one of the major institutions of learning in southern Europe, with departments of medicine, literature, law,

philosophy, mathematics, and science. The Egyptian Museum, in the academy of science, is one of the best endowed in Europe.

Turin, anciently called Taurasia, was named for the Taurini, a Ligurian tribe whose capital it was. In 218 B.C. it was captured and sacked by Hannibal during his expedition across the Alps. It became a Roman colony (Augusta Taurinorum) in 166 B.C., and after the decline of the empire it passed to the Lombards. After changing hands several times in the ensuing centuries, it passed to the House of Savoy ca. 1280. It was besieged and taken in 1536 by the French, who occupied it until 1562. Returned in the latter year to the House of Savoy, it was capital of the duchy. During the War of the Spanish Succession, Turin withstood a long siege (1706) by the French, and in 1720 it became capital of the kingdom of Sardinia. Another period of French occupation intervened from 1798 to 1814, when Turin was returned to Savoy by Victor Emmanuel I. The city was a center of Italian nationalistic efforts and was the capital of Italy in 1861-65.

As a vital industrial and transportation center, Turin suffered severe damage by bombing in World War II; American troops occupied it on April 30, 1945. Population, 1951 (estimated), 720,000.

Turkestan (*túr-kě-stān'*), a name generally used to denote the region bounded on the n. by Siberia, and on the s. by Tibet, India, and Afghanistan. The western boundary is the Caspian Sea and the eastern, Mongolia and the Gobi Desert. The tableland of Pamir, rising to a height of 15,000 ft., divides the region into Eastern, or *Chinese Turkestan*, and Western, or *Russian Turkestan*. Although etymologically the name means a territory occupied by Turkish peoples, actually Chinese Turkestan's 2,000,000 population is composed of Kirghizes, Sarts, Kal-mucks, Uzbeks, Tajiks, and other races in lesser numbers. The language is Eastern Turkish with an admixture of Chinese and Persian words. Russian Turkestan embraces a population of 8,525,000 and comprises Kirghizes, Sarts, Uzbeks, Kiptchaks, and a relatively small number of Russians.

Turkestan has figured prominently in Asiatic history, being successively under Persian, Macedonian, Arabic, Chinese and Russian rule. During the 8th century it was divided into small possessions and was finally overrun by Genghis Khan and his Mongols. In 1227, Genghis Khan divided his empire among his four sons, giving Turkestan to his second son, Jagatai. Terrorized by native chieftains who refused to accept Jagatai's dominion, Turkestan was torn by internal conflict until 1369, when a strong man in the person of Timur (known in Western history as Tamerlane) proclaimed himself sovereign.

Thereafter Timur expanded his empire until it stretched as far west as Moscow, and as far east as the banks of the Ganges. In 1398, he returned home to Samarkand, heavy with spoils of war with which he proceeded to decorate the city. Although essentially a man of war, Timur did not neglect the arts of peace, encouraging the scholars and artisans who lived within his domains by gifts and other marks of personal favor. After his death dissension and strife gripped the country. China subdued the eastern province, and has maintained its rule, despite frequent small revolutions, down to the present. The western portion was conquered by Russia, and has been divided into the self-governing Soviet Socialist Republics of Uzbek, Turkmenistan, Tajikistan, and Kirghiz.

Chinese Turkestan lies largely within the region of the Tarim River basin. Much of the surface is desolate and unfertile, but belts of arable land extend along its streams. The climate is severe and extremely dry. The mountain districts are rich in minerals, including nickel, gold, silver, copper, lead and asbestos. Lake Lob Nor contains extensive salt deposits. The territory's principal occupations are agriculture, stock-raising, commerce, and hunting. Cotton, silk, and animal products are exported, and its larger cities, such as Kand, Khotan, Aksu, and Kashgar, export quantities of manufactured copperware, silk, silver, cotton, carpet, felt and leather goods. Politically it is now part of the province of Sinkiang. In June 1946, the Central Government of China, under Chiang Kai-shek, gave to the people of Sinkiang a voice in the administration of the province.

Russian Turkestan comprises the Turkoman steppes, the Trans-Caspian districts, the former khanates of Kiva and Bokhara, and the oasis of Merv, a total area of 1,750,000 sq. m. Its territory ranges from desert wastes to valleys of extreme productiveness. Staple crops are wheat, rice, millet and oats, with the increased production of cotton being encouraged by the government. Stock-raising constitutes its leading occupation. Large numbers of sheep are raised. Although manufacturing is still in the development stage, its carpets and rugs are highly valued in European markets. Its chief exports are raw animal products which go largely to European Russia.

Merv, Bokhara, Samarkand, and Tashkent are its leading cities. In 1921, the governor-generalship of Turkestan of Czarist Russia became a self-governing Soviet Socialist Republic. A further re-allocation of lands (1925) divided the country into the new states of Uzbekistan, Turkmenistan, and Tajikistan. A few small areas within this territory were allowed autonomy, subject to supervision by the Central Soviet. The remaining Turkestan areas were amalgamated with the

Autonomous Kirghiz Soviet Socialist Republic. The new government has improved and extended the Trans-Caspian R.R. through the heart of Western Turkestan, facilitating future commercial expansion. As a result of the successive Five-Year Plans, the industrialization of the region has proceeded at a rapid pace. The number of schools and colleges has greatly increased. Turkish is the country's chief language, and its religions include the Mohammedan, Greek and Roman Catholic, and Protestant.

Turkey (*túr'kĭ*), a large bird native to North America. It was first brought to Europe when Hernando Cortez returned to Spain from his expedition of discovery in the 16th century. Only two species are known, the common turkey and the Honduras turkey. The *common turkey* was distributed formerly in a wild state from the Atlantic to the Rocky Mts., extending southward to the Isthmus of Panama, but at present is found only in some sections of the southern and western parts of the continent. The bare head and neck are peculiarly marked by a number of fleshy tubercles, and the male has a tuft of hair hanging from the breast. The weight of a full-grown wild gobbler is 15 to 22 lbs., the hen being somewhat smaller, but the domestic turkey is not so large and its flesh is less finely flavored.

Turkeys in the wild state frequent only the timber districts, where they live in flocks, feeding on seeds, insects, berries, frogs, lizards, and tender plants. They nest under a bush or in tall grass, line the nest with leaves or feathers, and usually have about 12 cream-colored eggs. The plumage is a golden bronze, banded with black, and diversified by violet and greenish markings. In the domestic state the turkey is highly useful for its

TURKEY

Courtesy N. Y. Zoological Society





Courtesy Turkish Embassy, N. Y.

HARBOR OF ISTANBUL, TURKEY

flesh. The turkey is raised extensively along with other poultry. It is now an important domestic fowl in Europe and other countries as well as in North America. The hen lays from 10 to 15 eggs twice a year; the eggs are mostly incubated by female chickens, though sometimes by the turkey hen. Young turkeys are delicate, being easily overcome by hot sun or cold rains, although the adult is quite hardy. The *Honduras turkey*, an allied species, is native to tropical America and the West Indies. It is somewhat smaller than the common turkey, but has more beautiful plumage. The neck is less wattled and it has eyeline spots on the tail feathers.

Turkey, a republic of Europe and Asia Minor, formerly part of the Ottoman empire. Before World War I, the Ottoman empire included Turkey-in-Europe, Asia Minor or Anatolia, Armenia, Kurdistan, Mesopotamia, Syria, Palestine, and Arabia, totaling about 710,224 sq. m.

AREA, POPULATION, AND PHYSICAL FEATURES. The area of Turkey is 296,503 sq. m. Ankara (formerly Angora), with 295,000 inhabitants in 1950, is the capital. The capital of the former empire, Constantinople, now Istanbul, is the largest city, with more than 1,000,000 inhabitants. Turkey is bounded on the w. by the Aegean Sea and Greece, on the n. by Bulgaria and the Black Sea, on the n.e. by Soviet Russia, on the e. by Iran (Persia), and on the s. by Iraq (Mesopotamia), Syria, and the Mediterranean Sea. Asiatic Turkey is a geographical unit consisting of an elevated plateau from which wooded foothills lead to the sea on the north, west, and south, and to alluvial plains on the southeast. The principal rivers of European Turkey are the Ergene and the Maritsa, while in Asia Minor are the Kizil Irmak, Yesil Irmak, the Seyhan, the Sakarya and others. The climates of the Black Sea coast and of the Mediterranean shore are mild the year around. The central plateau has snowy winters and the summers are dry and hot with little rainfall.

PEOPLE, LANGUAGE, AND RELIGION. The Turks

TURKEY

are descendants of the ancient Hittites, and now evince both the long-headed Mediterranean stock and an older, round-headed type. The Turkish language is a pure branch of the Uranian tongue, related to Finnish and Hungarian. Since 1928, the Latin (European) alphabet has replaced the old Arabic script. All Turks are Mohammedans, although Church and State are each allocated their separate spheres of influence. Greeks, Armenians, Jews and persons of other faiths are also included among Turkish citizens, although they do not number over 250,000. The total population of Turkey in 1950 was 20,902,628.

RESOURCES AND TRADE. Agriculture is the principal occupation, with modern methods everywhere replacing the primitive land culture that once existed. Tobacco, wheat, barley, rye, oats, fresh fruits, wool, raisins, figs, and olives are the principal products, and the output of cotton is being increased. Turkey has large mineral resources which include chrome ore and copper, now highly developed, iron ore, coal (bituminous and lignite), manganese, emery, asbestos, antimony, and lead. There is also asphalt, meerschaut, salt, and a little gold and silver. Petroleum has been found, and is being produced. State-sponsored plants for the manufacture of textiles, paper and cellulose, glass, iron and steel, sugar, and cement are now giving way to privately owned enterprises which are encouraged by the government.

GOVERNMENT, TRANSPORTATION, AND FINANCE. The constitution of 1925, amended in 1934, provides for a single legislative national assembly elected every four years on a basis of one member to every 40,000 people by men and women 22 years of age and over. The national assembly elects the president of the republic from among its members for a four-year term. Mustapha Kemal Atatürk (*q.v.*), the founder and first president of the Turkish Republic, who died in 1938, inaugurated a program of reforms and westernization that included the abolition of polygamy, the institution of civil marriage, the introduction of the Gregorian calendar, the 24-hour clock, the metric system, and family surnames. Sunday instead of Friday was made the official Sabbath. In 1949 there were 26,703 m. of roads and 4,700 m. of railroads.

The Turkish lira, divided into 100 kurus (piastres), is the monetary unit (see *Coin*). Both expenditures and estimated revenues exceeded \$450,488,000 in 1951, with over 30 per cent of the budget allocated to national defense.

DEFENSE. Since 1939, the Turkish government has spent between 30 and 45 per cent of its annual budget for defensive preparedness, over and above the military aid extended by the U.S. The Turkish army, in 1950 was the largest in Europe (excluding the U.S.S.R. and her satellites), and

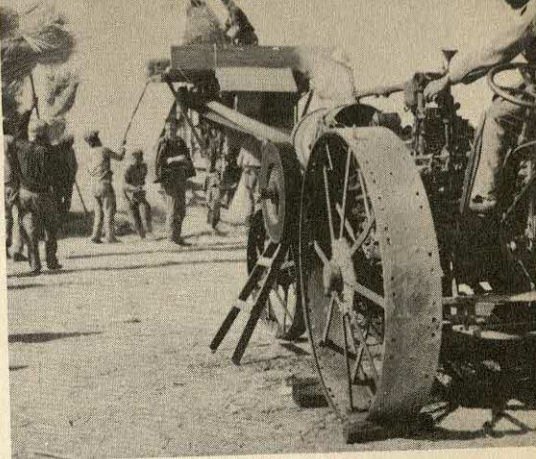
TURKEY

is considered one of the most efficient and best trained. Military training is compulsory for two years from the age of 20, or whenever the draftee has completed his education.

EDUCATION. Education, compulsory through grade school, and free through the university, is available to both sexes. The state universities are in Istanbul and Ankara. Robert Coll. for Men at Istanbul and Istanbul Coll. for Women are among the American educational institutions in Turkey.

HISTORY. In A.D. 1227, the Ottoman Turks crossed the Euphrates River, driven westward from Asia by the Mongols. They had occupied a region in the Altai Mts., where in the 8th century they were conquered by the Saracens and converted to Mohammedanism. In the 13th century, the Ottoman Turks received lands in Asia Minor as a reward for their services to the Seljuk Turks in wars with the Mongols. Othman, who died in 1326, was the founder of the Ottoman empire, having conquered the Saracens, Mongols, and Seljuks. Murad I (1359-89) captured Adrianople in Europe and made it the capital of the empire, while Mehmed II (1451-81) conquered the Byzantine empire by taking Istanbul in 1453. Bosnia, Albania, Serbia, and Greece, together with Syria and Egypt, were quickly added to the Ottoman domain. Solyman I (1520-66) brought Turkey to its greatest economic and military power. He annexed Rhodes in 1523, and half of Hungary in 1526, and Mesopotamia, Bagdad, Georgia, and Moldavia became his tributaries. His westward march into Europe was stopped at the gates of Vienna in 1529 by Charles V of Germany. In 1571, the Turks were disastrously defeated at the great naval battle of Lepanto by the allied fleets of Venice, Spain and the Papacy. A second defeat was suffered by the Turks from a German army near Vienna in 1683, and the famous Prince Eugene of Savoy routed them at Zenta in 1697. Catherine II of Russia wrested the Crimea and a large portion of southern Russia from the Turks in 1774. Napoleon conquered Egypt in 1798, but was expelled from this region in 1801 by a coalition of England, Turkey, and Russia. In 1812, Russia, on the pretext of protecting Christian minorities within the Ottoman empire, occupied Moldavia, Bessarabia, and the mouth of the Danube River.

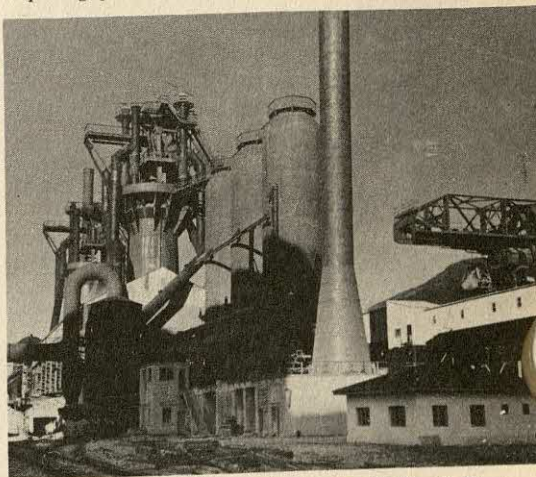
The Greek War of Independence, breaking out in 1821, enlisted the sympathies of Russia, France, and Great Britain and culminated in a Turkish defeat at the naval battle of Navarino in 1827. In 1831, the Pasha of Egypt revolted against the sultan, whose authority was preserved through Russian intervention. As a result of the Crimean War, in which France and England assisted the Turks, the Ottoman empire retained Wallachia, Moldavia, and other frontier terri-



Courtesy Turkish Commercial Attaché, N. Y.

MECHANIZATION OF TURKISH AGRICULTURE

Modern techniques of land cultivation are rapidly replacing primitive methods

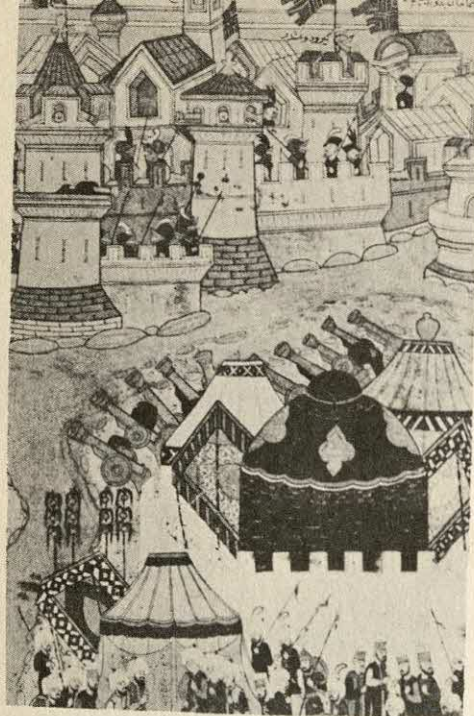


Courtesy Turkish Information Office, Wash., D. C.

IRON AND STEEL PLANT AT KARABUK

Large-scale production of iron and steel for civilian use was begun in Turkey in 1939. The industry above is located at Karabuk, a town developed specifically to accommodate the industry and its increasing personnel

tory. Because of massacres of Christians by Ottoman troops in rebellious Bosnia, Herzegovina, and Bulgaria during 1875-76, Russia declared war against Turkey in April 1877. As a result, Rumania declared its independence of Turkey in May 1877. In the ensuing war, Russian arms prevailed, notably at Kars and Plevna, and Turkey was forced to accept the Treaty of San Stefano. By the Treaty (Congress) of Berlin, signed July 13, 1878, the Great Powers granted autonomy to the principality of Bulgaria, gave Bessarabia to Russia, allowed Austria to occupy Bosnia-Herzegovina, and recognized the independence of Serbia, Rumania, and Montenegro. The Turks were forced to stand by help-



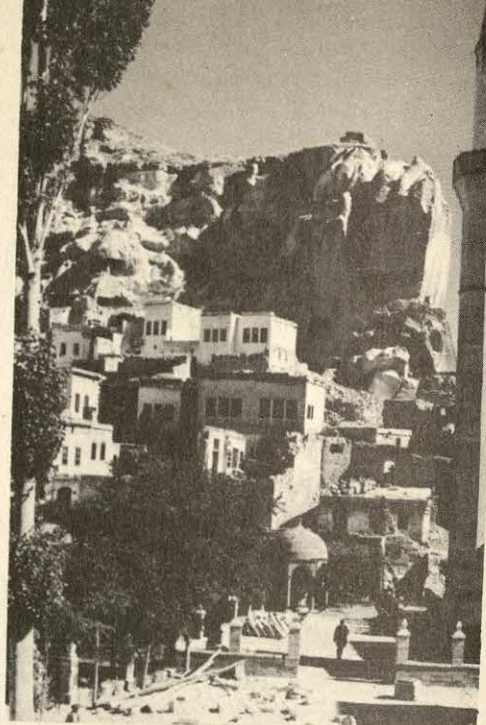
SIEGE OF BELGRADE BY SOLYMAN I IN 1521

Belgrade was intermittently under Turkish domination from 1521 until 1866

lessly when France occupied Tunis in 1881.

Sultan Abdul-Hamid II (1876-1909), whose reign began with great losses of Turkish territory, promulgated a constitution, shortly after his accession, but abolished it soon and proved to be a despot. In 1885, Eastern Rumelia revolted against the empire and was annexed to Bulgaria. In 1897, as a result of a war with Greece, which had annexed Thessaly and part of Epirus in 1881, the Sublime Porte, as the Turkish government was called, lost the strategic island of Crete. The refusal of Germany to act against Turkey in the Cretan conflict marked the beginning of the German "*Drang nach Osten*," or policy of expansion eastward, and in 1899 the Germans were granted permission to build the Berlin-to-Bagdad railway.

In 1908, the Young Turks, a liberal and progressive group, rebelled against Abdul-Hamid, who then restored the constitution of 1876. Austria annexed Bosnia-Herzegovina outright in 1908, and Turkey evacuated the Sanjak of Novi-Bazar. Encouraged by these signs of weakness, the Kurds and the Albanians revolted against the empire, and a military revolt was staged at Istanbul against the Young Turk regime, April 13, 1909. The Young Turks sent an army to Istanbul, punished the rebels, and dethroned the sultan in favor of Mehmed V. In 1911, Italy, after being assured of the neutrality of the Great Powers, declared war upon Turkey over Tripoli, annexed that country together with Cyrenaica or



OLD TOWN OF URGUP

Many Turkish towns and villages are nestled in sheer rock

Libya, and occupied the Dodecanese Islands in the Aegean Sea. In the following year Bulgaria, Greece, Serbia, and Montenegro reduced the Ottoman empire in Europe to the strip of territory between Adrianople and the Bosphorus. During World War I, the Turkish government, ruled by the Young Turks and suspicious of Russian intentions and British promises, joined the Central Powers, and declared war on the Allies. Ottoman troops, while vainly attacking the Suez Canal, successfully defended the Dardanelles against the British, but were forced to give up Arabia, southern Palestine, and Mesopotamia in 1917. Turkey, pressed on all sides, signed an armistice with the Allies on Oct. 31, 1918. The Treaty of Sèvres of Aug. 10, 1920, deprived Turkey of a large part of her empire, but at the same time rallied the Turks to the Nationalist party which, under Mustapha Kemal, drove an invading Greek army from Smyrna in 1922 and proclaimed a republic. The caliphate was abolished in 1924, and the Church was separated from the State; each was given its own sphere of influence, without any interference with the religious beliefs of Turkish citizens of Mohammedan or other faith. With Mustapha Kemal Atatürk as its first president, Turkey progressed economically, underwent a broad modernization program which is still continuing in every sphere, and began to improve its relations with the U.S., England, France, and the Soviet Union (although Communism was outlawed at the outset of the

republic). In 1936, the Montreux Convention permitted Turkey to remilitarize the Dardanelles. The Sanjak of Alexandretta, which had become part of Syria in 1925, was incorporated into the province of Hatay by a Turkish-French treaty. In addition, on June 23, 1939, the vilayet of Hatay (2,006 sq. m.), with about 275,000 inhabitants, was ceded by France to Turkey.

At the death of President Kemal Pasha (*q.v.*) in 1938, Ismet İnönü (*q.v.*), for two decades Kemal's close collaborator, became president.

With the outbreak of World War II, Turkey declared its neutrality; although friendly to the Allies, Turkey signed a nonaggression pact with Germany in 1941. Turkey broke off diplomatic relations with the Axis Powers, Aug. 2, 1944; and declared war on Germany and Japan, Feb. 23, 1945.

In March 1945, Russia terminated the Russo-Turkish Friendship Pact of 1925, looking toward a new treaty recognizing Turkey's status as an ally. After World War II, however, Turkey moved steadily toward the West and was one of the first beneficiaries of U.S. aid (under the Truman Doctrine) to countries attempting to stave off outside interference and to achieve economic recovery. Despite increasing aid, however, by 1958 Turkey still was plagued by economic problems, and a stabilization program was established in that year. It was contributed to by the U.S. and various international agencies in the form of grants, loans, farm-surplus commodities, and postponed payments on previous loans.

A charter member of the U.N., Turkey supported the Western democracies in the fight against Communist aggression in Korea (*q.v.*). Although the general elections of May 1950 ousted the Republican party, which had been in power since 1923, the basic foreign policies remained unchanged. When the Democratic party, under Pres. Celâl Bayar, took power, Turkey was admitted to the North Atlantic Treaty Organization in 1951 and was elected to the U.N. Security Council in October 1953. In 1955 she became a charter member of the Middle East Treaty Organization.

In 1955, in an attempt to protect the rights of the Turkish minority in Cyprus (*q.v.*), Turkey became involved in the bitter and violent struggle on that island for union with Greece. This led (1959) to an agreement among Great Britain, Greece, and Turkey, making Cyprus independent.

Turkey Buzzard (*túr'kỹ búz's'ěrd*). See *Vulture*.

Turkmenistan (*túrk-měn-i-stān'*) or TURKMEN SOVIET SOCIALIST REPUBLIC, one of the 16 constituent republics of the Soviet Union, bordered by Iran (Persia) and Afghanistan on the s., the Caspian Sea on the w., and the Uzbek

Socialist Soviet Republic on the n. and e. The area is 187,200 sq. m. The capital is Ashkhabad (Poltoratsk), which had a population of 126,580 in 1939. Other large towns are Merv, Leninsk, Kerki, and Tashauz. The Kara Kum Desert covers much of the region. Agriculture, based on irrigation, is the main industry and cotton, grain, and oil seeds are the principal crops. Turkmenistan is famous for its carpets and a fine breed of horses. Oil, ozocerite, mirabilite, and sulfur are the chief mineral products. There are rail connections to the Caspian Sea at Krasnovodsk. The Turkomans, who are Sunni Mohammedans, speak a tongue related to Turkish. In 1939, Turkmenistan had five colleges, 38 technical high schools, nine scientific research institutions and eight professional theater companies. The country came under Russian control in 1881 and became a Soviet republic in 1924. Population, *ca.* 1,317,000.

Turks and Caicos Islands (*túrks ānd ká'-kūs i'landz*), two island groups of the Bahama chain *ca.* 90 m. n. of Haiti. The islands are a dependency of Jamaica (*q.v.*) but in 1959 were moving toward colony status within the federation of The West Indies (*q.v.*). The principal islands have an area of *ca.* 166 sq. m. Salt is the chief product. Estimated population (principal settlements), 1955, 5,250.

Turku (*tóor'kóo*), in Swedish Åbo, a seaport city of Finland, capital of the Turku-Porti department. Situated on the southwestern coast, about 95 m. w. of Helsinki, the city is an important commercial center. Shipbuilding, textiles, and lumber are the main industries. Population, *ca.* 100,000.

Turmeric (*túr'měr-ik*), a plant (*Curcuma longa*) in the ginger family, or the underground stem of the plant. Native to southern Asia and the East Indies, it is a large herbaceous perennial with a short stem, a tuft of leaves (each about 8 in. by 2 ft.), and a conical flower spike about 6 in. long. The spike is pale green and yellow below and pink at the tip. The underground stems yield an orange-red or deep-yellow dye, which may also be used as a spice. The dye changes color in the presence of boric acid and alkalies and is used by chemists in the form of a solution or as turmeric paper (filter paper soaked in the solution and dried) to test for these substances.

Turner (*tárn'ěr*), JOSEPH MALLORD WILLIAM, landscape painter, born in London, England, April 23, 1775; died there Dec. 19, 1851. He entered the Royal Acad. of England as a student in 1789. His study and sketching were so successful that he gave numerous exhibits and in 1799 became an associate of the Royal Acad., of which he was made a full member in 1802. In 1808 he was made professor of perspective at the Royal Acad. His early paintings were



Courtesy Metropolitan Museum of Art, N. Y.

THE GRAND CANAL, VENICE. PAINTING BY JOSEPH M. W. TURNER

largely landscapes in water colors; in 1793, however, he exhibited an oil painting in the Academy for the first time, and from that time on oil painting became as much his domain as water color. He traveled much on the continent, his first tour being in 1802 and his second in 1804. He studied the works of the old masters, and drew inspiration for his work from the different countrysides. Nature as such, in its various moods and aspects, was always his topic, in landscapes and seascapes alike, whether he painted actual localities or fantastic sceneries overflowed with a strange magic light. Thus, Turner ranks among the greatest landscape painters, as did Claude Lorrain before him, or Camille Corot simultaneously and after him. Turner's output was tremendous—thousands of oil paintings, water colors and drawings, the majority of which he bequeathed to the National Gallery and which are now shown in a division called the Turner Gallery. He was buried in St. Paul's, beside Sir Joshua Reynolds. Among his most noted paintings are "Falls of the Clyde," "Sun Rising in Mist," "Dutch Boats in a Gale," "Decline of the Carthaginian Empire," "Crossing the Brook," "Burial at Sea," "Approach to Venice," "Bridge of Sighs," and "Dido Building Carthage." He did illustrations for poems by Scott, Rogers, Byron, and others.

Turner, NAT, Negro slave, born in South Hampton County, Virginia, about 1800; died Nov. 11, 1831. He claimed from childhood to have been inspired to free his race. In 1828 he

announced that he would receive a sign at the time the race was intended to rise and slay its enemies. He accepted the eclipse of the sun in February 1831 as such a sign. In the summer of that year he organized a force of about 50 followers, with whom he went from house to house and killed 53 whites. After this he was confronted by a force of men and put to flight, but he was captured after hiding for about six weeks. He was convicted of murder and hanged at Jerusalem, Va. Seventeen of his followers were captured and legally executed. The movement is commonly known as the *Nat Turner Insurrection*.

Turner, RICHMOND KELLY, naval officer, born in Portland, Ore., May 27, 1885; died in Monterey, Calif., Feb. 12, 1961. He was graduated with honors from the U.S. Naval Acad. (1908) and from Naval Aviation School (1927). He commanded the Aircraft Squadron of the Asiatic Fleet, 1928-29, and was chief of the Planning Division of the Navy's Bureau of Aeronautics, 1929-31. In 1932, he returned to sea as executive officer of the U.S.S. *Saratoga* but was transferred off the ship (1934) to become Chief of Staff of the Aircraft Battle Force. In 1940, he was assigned to the War Plans Division of the Navy Department, but after the U.S. entry into World War II, Turner, by then a rear admiral, was assigned to amphibious operations in the Pacific. He was in charge of some of the largest Allied assaults on Japanese-held islands, commanding forces in the Solomons, the Gilberts, the Marshalls, and other islands. In 1945 Turner was made an admiral and

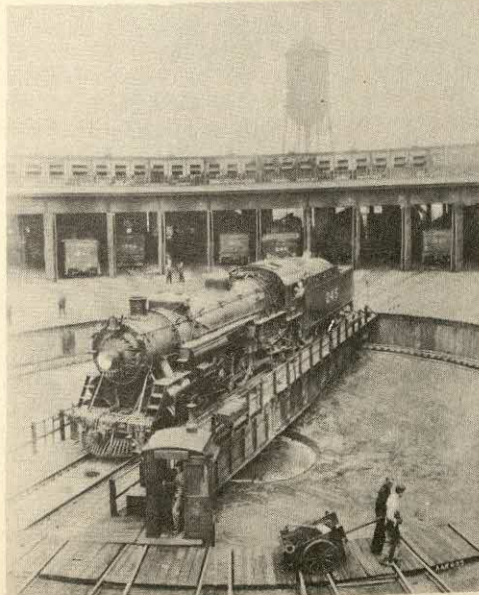
appointed U.S. naval representative to the U.N. Military Staff Committee. He retired in 1947.

Turnip (*túr'níp*), a biennial plant of the mustard family, which is cultivated for its fleshy, globular, edible root. It is a common vegetable in gardens and fields, being alike wholesome for culinary use and as a food for cattle. The seed is sown in temperate regions in June, usually broadcast, and the roots mature in ample time before the appearance of frost. In field culture the seeds are drilled by a machine in rows, thus facilitating cultivation by machinery. Many choice species have been obtained by propagation. Some are oblong rooted and others are globular, the latter being chiefly favored for table use. Among the chief species are the early Milan, white egg, early snow, flat Dutch, redtop, long white French, monarch Swede, and sweet German turnips. The *Swedish turnip*, or *rutabaga*, is an allied plant and is cultivated mostly for cattle food. It has about 86 per cent of water, while the common turnips have 90 per cent. Turnips were a favorite vegetable in the times of the Greeks and Romans, but the species have been greatly increased in size and fleshiness by careful culture.

Turnstone (*túr'n'stôn*), also called **CALICO BIRD** or **CALICO-BACK**, a genus of birds belonging to the plover family. One species is found in Greenland and Alaska, one is common to the eastern U.S., and the black turnstone prefers the Pacific coast.

TURNTABLE

Courtesy Louisville & Nashville Ry.



Turntable (*túr'n-tā-b'l*), a revolvable platform. In railroading, a turntable consists of a length of track on a circular platform pivoted at the center. The platform is supported at the ends by wheels which enable the platform to revolve. From the turntable tracks fan out in all directions so that an engine or a car may be switched from one track to another. Turntables are usually found in railroad repair yards and storage sheds.

Another type of turntable is that used on a phonograph. A record is placed on a turntable so that it may be revolved beneath a needle or some other device for "picking up" the sounds recorded upon it.

Turpentine (*túr'pěn-tín*), an oleoresin exuding from several species of coniferous trees. The commercial product is obtained chiefly from the pine tree. Crude turpentine flows naturally or from incisions made from about 5 to 6 in. from the root of the tree to a height of about 6 ft. American oil is derived from the species *Pinus palustris*, *P. heterophylla* and *P. echinata*. Turpentine has a density of about .87 and boils at about 154° C. It is produced in large quantities in North Carolina, South Carolina, and Georgia from the sap of the long-leaf pine. The larch tree yields the so-called *Venice turpentine*, a superior product. *Strasbourg turpentine* is derived from the silver fir, *German turpentine* from the Scotch fir, and *Canada turpentine* from the balsam and several other species of fir. The tree yields the largest flow of sap in the spring, when the best grade is obtained, and the inferior quality comes from the hardened gum forming at the sides of the cut made by the hacker. *Oil of turpentine* is made by distilling the sap in a copper vat, which is connected with the worm of the still. The volatile parts rise and are condensed into *spirits of turpentine*, while the hard part remaining forms the resin of commerce used in varnishes, soaps, etc. The oil, or spirits, of turpentine is used in medicine, in making varnishes and paints, and for dissolving resins.

Turquoise (*túr-koiz'*), a precious stone, having a blue or bluish-green color. It is composed essentially of a hydrated phosphate of alumina, with small proportion of oxide of iron and sulphate of copper, to which it owes its color. Turquoise is found in several regions of Persia, where it is used for ornamenting weapons, charms, and girdles. The best grades sold in the market are obtained in the mountains near Nishapur, Persia, but turquoise of a good quality is found in Mexico, where it is worked into jewelry, as also by the Indians of the American Southwest. It is so called because the mineral was first brought to Western Europe by way of Turkey.

Turtle (*túr'l*), a member of the reptilian

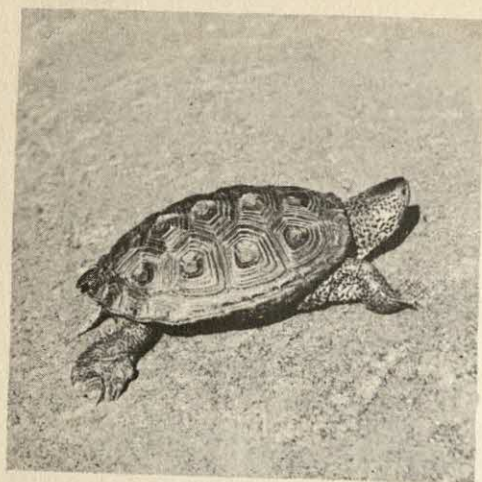
Turtles are the oldest of living reptiles, with fossil species known as early as the Permian period 200,000,000 years ago. A great number of fossil species are known; some, like *Triassochelys*, possessed true teeth. Today only an estimated 250 living species represent the order. The immediate ancestors of the group are not known definitely, but the turtles are most closely related to the fossil *Cotylosaurs*.

Living species are classified into two major groups or suborders: the *Pleurodira* or side-neck turtles, that withdraw the neck laterally; and the *Cryptodira*, or turtles that draw in the neck vertically in an S-shaped curve. These two groups are best characterized by the manner in which the head and neck are withdrawn, but in addition there are marked skeletal differences between the two. Among the side-neck turtles two families are recognized. All are inhabitants of fresh water and are primarily carnivorous. Living representatives are found only in the tropics and subtropics of South America, Australia, Africa, and Madagascar. The "*Arrau*" (*Podocnemis expansa*) is well known in the literature of South America because of its commercial importance as a source of oil and food. This species sometimes attains a shell length of 3 ft.

By far the majority of living turtles belong to the *Cryptodira*. This group is divided into 10 families, two of which contain the marine turtles that inhabit the warm seas. These marine species, with paddle-shaped limbs, include the *loggerhead turtles*; the *green turtles* that are esteemed as food; the *hawksbill turtles* from which the original "tortoise shell" (*q.v.*) is obtained; and the *leatherback turtles* that attain the largest size of any living turtle: a recorded length of 8 ft. and a weight of 1,400 pounds. The marine turtles rarely leave the water except when the females emerge on to the sandy beaches to lay their eggs. They are cosmopolitan in distribution, occurring in all the warm seas of the world. Occasionally wanderers have been reported along the coasts of England, Vancouver Island, and Nova Scotia.

Two of the remaining families include the soft-shelled turtles of North America, Africa, Asia, and New Guinea. These are characterized by the soft, flat shell devoid of outer horny shields, by the presence of only two or three claws on the feet, and by a pointed snout that ends in a soft, fleshy nasal projection or proboscis. The soft-shells are predominantly carnivorous and are inhabitants of fresh water, being found most frequently in muddy rivers. The maximum size attained is a reported shell length of 3 ft. Some species of soft-shell turtles are marketed for food.

The remaining six families of the *Cryptodira* contain the common fresh-water turtles, the terrestrial forms most frequently called "tortoises,"



Courtesy American Museum of Natural History, N. Y.

TURTLE

Diamond-back terrapin

order Testudinata (Chelonia). Turtles are characterized by the presence of a tough dermal shell enclosing the oval or circular body and by the complete absence of true teeth in any living species. All turtles possess four legs, although in some these are modified into paddle-shaped organs; all possess a relatively short tail; and all species are oviparous. Most turtles are aquatic or semi-aquatic, but a few are entirely terrestrial. Turtles are cosmopolitan in distribution, but are restricted to the tropical, subtropical, and temperate parts of the world.

The terms "turtles," "tortoise," and "terrapin" are commonly used to designate different groups of turtles. However, there is disagreement in the application of these separate names, and the demarcation between the groups so named is not satisfactory. Hence all members of this order may be referred to as turtles.

The shell that is characteristic of the members of this order is a durable protective structure formed by the addition of numerous dermal bones to modified portions of the skeleton. The skeletal modifications that accompanied the development of the protective bony shell produce the unique location of the limb girdles *inside* of the ribs. The shell is divided into two parts: the *carapace* that covers the back; and the *plastron* that covers the belly. These two parts are connected on each side by a narrow structure called the *bridge*.

In the absence of true teeth the mouth is lined externally by a hard, sharp-edged, horny sheath. This "beak" serves as an effective grasping and cutting device. Sometimes the horny sheath possesses notches that superficially resemble teeth. Turtles possessed true teeth in their early history but these were lost as the result of later modifications.

and the species of intermediate habits. These include the snapping turtles, the musk turtles, the pond turtles, the "diamond-back terrapin" that is highly esteemed as a delicacy in the Eastern U.S., the box turtles, and the giant land turtles that may attain a weight of 300 lb. Among the largest of fresh-water turtles is the alligator snapper of the Southern U.S. This species has been reported to attain a total length of 4 ft.

In many parts of the world turtles are of considerable economic importance as a source of food, and the eggs of some species are much sought after for the same reason. The former importance of the hawksbill turtle as a source of "tortoise shell" has decreased with the development of synthetic tortoise shell. Turtles are frequently considered harmful to man's interest because of their destruction of fish. Their importance in this connection has been greatly exaggerated, and scientific studies have shown that, with the exception of one or two species, turtles are either beneficial or neutral in their relations to fisheries. Another exaggerated belief about turtles is that they all possess great longevity. Actually the maximum recorded age is 152 years, but very few reach such ripe old age. See also color plate, *Turtles and Lizards*, in Volume IX.

Turtledove (*túr'tl-dūv*), any of several species of European and African wild doves, noted for their mournful song and affectionate ways. References to the turtledove are frequent in English poetry, where it is often called simply turtle, as it is in the Bible (Song of Solomon 2:12). In the U.S. the mourning dove is occasionally called a turtledove. See also *Dove*.

Tuscaloosa (*tūs-ka-lōō'sa*), county seat of Tuscaloosa County, Alabama, on the Warrior River and served by the Southern, the Gulf, Mobile & Ohio, and the Louisville & Nashville R.R.'s. Tuscaloosa was at one time the state capital. The Univ. of Alabama is located nearby, and the Bryce Hospital (a state mental hospital), a veterans hospital, and Stillman Coll. for Negroes are in the city. Tuscaloosa's manufactures include paper, dairy, and iron products, brick and lumber. Nearby are coal deposits, and the surrounding area produces cotton and vegetables. Tuscaloosa was settled in 1816 and incorporated in 1819. Population, 1940, 27,493; in 1950, 46,396.

Tuscany (*tūs'ka-nī*), in Italian, *TOSCANA*, a compartimento (region) of central Italy with an area of 8,880 sq. m., containing the provinces of Arezzo, Firenze (Florence), Grosseto, Livorno (Leghorn), Lucca, Massa, Pisa, Pistoia, and Siena. It is bounded on the w. by the Tyrrhenian and Ligurian seas, on the n. and e. by the Appennine Mts., and on the s. by the regions of Umbria and Latium. The terrain slopes upward from a level coastal area to a mountainous interior. The valleys produce olives, citrus fruits, wine, grain,

and tobacco. The extensive mineral resources include iron, copper, mercury, marble, lignite, and salt. There is a wide variety of manufactures, among them glass, ceramics, jewelry, and textiles, which have been associated historically with the city since the Middle Ages. The art treasures of Tuscany's cities, Florence, Pisa, Siena, and Arezzo (*qq.v.*), are vivid evidence of the region's glorious history. The Tuscan dialect has become the language of Italian literature. Florence is the capital of the region and its largest city; Leghorn is its chief seaport.

In ancient times, Tuscany was part of Etruria and was conquered by the Romans in the 4th century B.C. During the Middle Ages it was overrun by Goths, Lombards, Byzantines, and Franks; after 1115 the Popes and the Holy Roman emperors struggled for control, while the cities asserted their independence. From the 15th century it was under the rule of the Medici (*q.v.*) and became a grand duchy in 1569. In 1737 Tuscany passed to the house of Lorraine (*q.v.*). Annexed by Napoleon I, Tuscany again became a grand duchy in 1814. In 1860 it voted to unite with the kingdom of Sardinia, which became the kingdom of Italy the following year under Victor Emmanuel I. Population, 1951, 3,152,535.

Tuscarora (*tūs-ka-rō'ra*), signifying "hemp gatherers," a confederation of tribes belonging to the Iroquoian linguistic family. When first encountered they were living on the Roanoke, Tar, Pamlico, and Neuse rivers in North Carolina. They are noted for the two wars which they waged against the colonists and for their rather spectacular 18th-century migration, by way of Pennsylvania, to New York State, where they united with the Five Iroquois Nations. Since the start of the 19th century they have been located mainly on the Tuscarora Reservation in New York, but a few live in Ontario, Canada; *ca.* 700 are residents of the New York reservation (1950).

Tusculum (*tūs'kū-lūm*), a city of ancient Latium, Italy, situated in the Alban Hills, 15 m. S.E. of Rome. According to tradition, it was founded by Telegonus, the son of Ulysses and Circe. Under the republic and the empire, it was a favorite summer resort of wealthy Romans; Lucullus, Pompey the Great, Pliny the Younger, Cicero, and Nero had villas here. Tusculum was destroyed in 1191. Its ruins include an amphitheater, a theater, and a forum.

Tusk (*tusk*) or *TORSK*, a cod, about 20 in. long, yellow, with a long dorsal fin; it is found off Europe in the North Atlantic.

Tuskegee Institute (*tūs-kē'gē in'stī-tūt*), a nonsectarian, coeducational institution for Negro students, at Tuskegee, Ala. (population, 1950, 6,712). The institute was chartered and opened in 1881 as a normal school; it was called Tuskegee Normal and Industrial Inst. from 1893 to



Courtesy The Bettman Archive, N. Y.

MADAME TUSSAUD'S WAX WORKS

Effigies of the late King George VI, Queen Elizabeth, and Princess Elizabeth, now Queen Elizabeth II

1937, when the present name was adopted. There are schools of agriculture, education, home economics, commercial dietetics, mechanical industries, nursing, and veterinary medicine, as well as departments of business, music, and physical education. The institute's founder and first principal (1881-1915) was Booker T. Washington; George Washington Carver (*qq.v.*) taught here (1896-1943). The institute has an average student enrollment of less than 2,000 and a faculty of about 225.

Tussaud (*tŭ-sŏ'*), MARIE (GRESHOLTZ), modeler in wax, born in Berne, Switzerland, 1760; died in London, England, April 16, 1850. She learned her art from her uncle, J. C. Curtius and later modeled the heads of many notables. In 1802 she moved her collection to London, where it has remained a landmark until the present. A chamber of horrors, a part of her collection containing relics of famous criminals and instruments of torture, was destroyed by fire in 1926, but a new chamber was opened later.

Tussock Moth (*tŭ'sŭk mŏth*), a small family of moths, Lymantriidae, widely distributed throughout the world. The family received its popular name from one of its most destructive species, the white-marked tussock caterpillar. This handsome creature has a red head, a body striped with yellow and black, and, on its back, four tussocks (or tufts) of short white hair and

TWEEDSMUIR

three pencils of long black hair. The adult moth is small and dull-colored; the female is wingless. She deposits her eggs on top of the cocoon from which she emerged, covers them with a waterproofing secretion, and then dies. The numerous caterpillars hatch in three weeks and feed voraciously on leaves, especially those of pear and apple trees. Two other destructive members of this family are the gypsy moth and the brown-tail moth.

Tutankhamen (*tŏot-ängk-ä'mĕn*) or TUT-ENKHAMON, one of the last pharaohs of the 18th dynasty of Egypt and son-in-law of Amenhotep IV (*q.v.*). Tutankhamen reigned from ca. 1358 B.C. to 1350 B.C. Historically of minor importance, he is widely known for archaeological reasons. Hidden in a pyramid near Luxor (*q.v.*), his burial chamber (discovered by Howard Carter, an English Egyptologist in 1922) was found untouched. The pharaoh's mummy was in a golden coffin. Gems and other rare treasures were found, some of which are in the National Museum in Cairo, Egypt.

Tutuila (*tŏo-tŏo-ē'lŭ*). See *Samoan Islands*.

T.V.A. (*tĕ vē ā*) or TVA. See *Tennessee Valley Authority*.

Tver (*tă-vĕr'*), former name of Kalinin (*q.v.*), a city in the U.S.S.R.

Twain (*twān*), MARK. See *Clemens, Samuel*.

Tweed (*twĕd*), a river in southern Scotland and northeastern England, about 97 m. long. Rising in Peeblesshire, it flows through or bounds the counties of Peebles, Selkirk, Roxburgh, Berwick, and Northumberland (England), and enters the North Sea at Berwick-upon-Tweed. Its tributaries are the Ettrick, Teviot, Till, Gala, Leader, Eden, Leet, and Whiteadder. The Tweed, which has important salmon fisheries, is celebrated in poetry and fiction.

Tweed, WILLIAM MARCY ("BOSS TWEED"), politician, born in New York City, April 3, 1823; died there, April 12, 1878. He was the son of a chairmaker and worked as a bookkeeper in his father's firm. In 1852 he became a New York City alderman; later he served in Congress (1853-55) and as state senator (1867-71), in the meantime becoming powerful in the Tammany Society (*q.v.*). In 1870 he was appointed commissioner of public works for New York City. While holding this office, and as head of a group of politicians called the "Tweed Ring," he gained control of the city's finances and defrauded the city of many millions of dollars. He was arrested in 1871, tried twice (1873), and sentenced to 12 years' imprisonment. Escaping from jail (1875), he fled to Cuba and later to Spain, but was returned to the U.S. (1876) by the Spanish authorities, and died in jail.

Tweedsmuir (*twĕdz'mŭr*), BARON. See *Buchan, John*.

Twelfth Night (*twɛlfθ nīt*), a traditional English celebration, marking the end of the Christmas season. It falls on the 12th night after Christmas—on Jan. 5, the eve of Epiphany (*q.v.*). The customary entertainment included the presentation of plays, of which Shakespeare's "Twelfth Night" is the most notable example.

Twelve Tables (*twɛlv tã'b'lz*), a written code of law promulgated in ancient Rome. It was the earliest systematic statement of the Roman law and was prepared on a demand made by the plebeians. The latter demanded a written code, since the oral, unwritten law resulted in the lax and partisan settlement of legal disputes on the part of the patrician judges. Accordingly, ten magistrates were elected to write the laws, in 452 B.C., and before the end of the following year, ten tables were approved by the popular assembly. Soon two other tables were completed. The Twelve Tables were regarded as a guarantee of personal liberty. They did not constitute an actual new legal code, but comprised a compilation of the previously unrecorded law.

Twenty-One Demands (*twɛn'ty-wʌn də-mãnz'*). See *Far Eastern Question*.

Twickenham (*twik'ɛn-əm*), a municipal borough in Middlesex, England, on the Thames River, 11 m. s.w. of London, of which it is a residential suburb. Here, the traditional Rugby matches between Oxford and Cambridge are played. Twickenham is famous as the home of Alexander Pope and Horace Walpole (*qq.v.*). Population, 1951, 105,645.

Twiggs (*twigs*), DAVID EMANUEL, soldier, born in Richmond County, Georgia, in 1790; died in Augusta, Ga., July 15, 1862. He fought in the War of 1812 and served in the Mexican War, becoming a brigadier general in 1847. As commander of the Department of Texas, Twiggs capitulated to Confederate Gen. Ben McCulloch in February 1861. Accordingly, he was dismissed from the U.S. Army and subsequently appointed a major general in the Confederate Army.

Twilight (*twi'līt*), the illumination of the sky after sunset and before sunrise. It is caused by the scattering of sunlight from the upper atmosphere. Evening twilight ends and morning twilight begins when the sun is 18° below the horizon. The duration of twilight is shorter in the tropics than in temperate latitudes; it can last all night in latitudes greater than 50°.

Evening twilight, viewed in a clear sky, shows a complex but definite sequence of phenomena: Low in the west there appear in turn horizontal color bands, a bright whitish glow, a red or salmon-colored light which reaches its greatest size and brightness when the sun is 5° below the horizon, and lastly a pale bluish-white glow. In the east shortly after sunset, the earth's shadow appears as a purplish-gray horizontal layer,

which rises and becomes increasingly diffuse. Morning twilight shows corresponding phenomena in reverse order.

Twilight Sleep, a method of combating labor pains by the use of repeated injections of a combination of two depressant drugs, morphine and scopolamine. First introduced in Germany in 1902, it was used rather widely because it seemed to produce in the patient a loss of pain memory. Because of its dangers and variability of results, its use has been almost entirely discontinued.

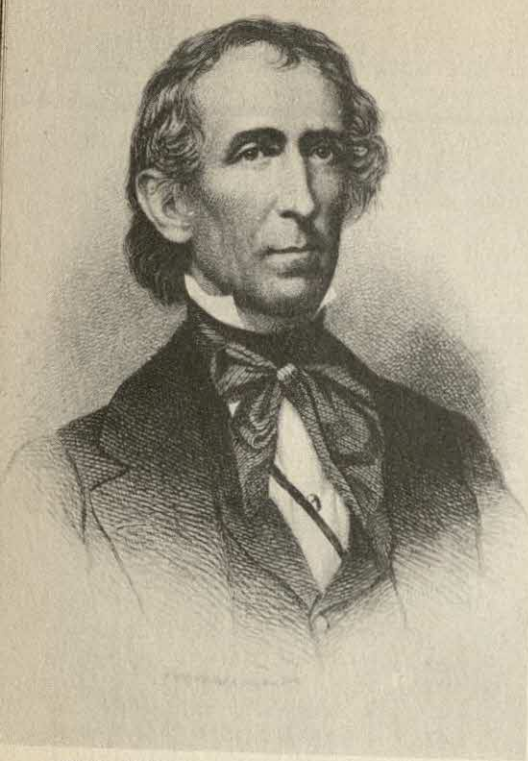
Twins (*twinz*), two individuals delivered at one birth. In humans, twin births occur in one out of every 87 live births. Twinning is considered an inherited trait. Twins may result from the simultaneous fertilization of two separate ova, producing *fraternal twins*, or from the splitting of a single ovum, producing *identical twins*. Fraternal twins may or may not be of the same sex and may or may not resemble each other. Identical twins are the subjects of continuing research as to the extent of their similarities.

Single-ovum twins may develop into two complete and separate individuals, may be joined to each other by a band of tissue, may share some structure or organ (see *Siamese Twins*), or one may remain a fragment of tissue attached to an otherwise normally developed infant.

Two Sicilies, KINGDOM OF THE. See *Sicily: HISTORY*.

Tydings (*tīd'ingz*), MILLARD EVELYN, U.S. Senator, born in Havre de Grace, Md., April 6, 1890; died there Feb. 9, 1961. He was graduated from the Univ. of Maryland (1913) and began his political career in the Maryland legislature in 1916. A Democrat, Tydings served (1923-27) as a U.S. Congressman from Maryland. As a U.S. Senator (1927-51), he strongly opposed many New Deal and Fair Deal policies. Tydings was chairman of a Senate subcommittee which deplored allegations of Communist infiltration of the State Dept. made by Sen. Joseph R. McCarthy (*q.v.*). The findings of the Senate probe brought Tydings and McCarthy into a heated public controversy; this controversy had a strong bearing on the political standing of Sen. Tydings, who lost (1950) his Senate seat to a McCarthy-supported candidate, John M. Butler.

Tyler (*tī'lēr*), county seat of Smith County, Texas, 85 m. s.e. of Dallas, on the St. Louis Southwestern and the International-Great Northern R.R.'s. It is surrounded by a fertile farming, stock-raising, and fruit-growing region. Tyler is a center for raising and shipping rose bushes, and the city also has a large rose garden of its own. It is the seat of Texas and Tyler junior colleges. Manufactures include canned fruits, tile, clothing, and pottery. Tyler was settled in 1884 and incorporated as a city in 1875. Population, 1950, 38,968.



JOHN TYLER

Tyler, JOHN, 10th President of the U.S., born at Greenway, Charles City County, Virginia, Mar. 29, 1790; died in Richmond, Va., Jan. 18, 1862. His father, John Tyler, served as governor of Virginia (1808-11). The son went to William and Mary Coll. at the age of 12, graduating at 17, and was taught law by his father. He married Letitia Christian in 1813. He served in the Virginia legislature (1808-11) and was later selected to fill a vacancy in the U.S. House of Representatives (1816-21), where he denied the right of Federal power to limit slavery in the territories during the struggle over the admission of Missouri (see *Missouri Compromise*). After being governor of Virginia (1825-27), he served in the U.S. Senate (1827-36), where he opposed both the Bank and Jackson's measures against it (see *United States: PANIC OF 1837*), and refused to support the bill to compel South Carolina to abide by Federal law. In 1836, Tyler resigned from the Senate rather than accept his legislature's instructions to vote in favor of a resolution expunging from the Senate's *Journal* the record of its censure of Jackson for removing the deposits.

His break with Jackson, and tangled intrigues among Virginia's political factions, convinced Whig leaders that Tyler would make a useful and innocuous running mate for Harrison in 1841. When Harrison died (1841), the Whigs discovered that they had selected no pliable puppet but rather a man who successfully forged his own policy. Tyler twice vetoed bills to re-establish

TYLER

a national bank. He vetoed tariff bills and a general internal-improvements measure. He then attacked Henry Clay's "American System" (bank, tariff, and internal improvements at national expense) in a message to Congress. When all the members of his Cabinet resigned, except Secretary of State Daniel Webster (*q.v.*), Tyler replaced them with men who reflected his own views. He replaced Webster with John C. Calhoun (*q.v.*) as soon as Webster had completed the negotiations with England to settle the question of the northeastern boundary.

Tyler was an efficient administrator, reorganizing the Navy Department and helping to end the prolonged war against the Seminole Indians. During his term of office China was opened to American commerce and he even began negotiations looking toward the annexation of Hawaii. His chief success, however, was bringing Texas (*q.v.*) into the Union.

He retired to private life after his second marriage, to Julia Gardiner, in 1844, a President without a party following who had nevertheless seen almost his entire program accepted. When the Civil War came, Tyler urged the border states to take the lead in proposing conciliation; but when the Conference of February 1861 adjourned in futility, he voted for the secession of Virginia.

One of his sons, LYON GARDINER TYLER (1853-1935), became president of William and Mary Coll. in 1888 and wrote "Letters and Times of the Tylers" (3 vols., 1884-96).

Tyler, ROYALL, jurist and playwright, born in Boston, Mass., July 18, 1757; died in Brattleboro, Vt., Aug. 26, 1826. He served in the Revolutionary War and against Shays' Rebellion, practiced law in Massachusetts and Vermont, and served (1807-13) as chief justice of the supreme court of Vermont and (1811-14) as professor of jurisprudence at the Univ. of Vermont. Of his several plays, "The Contrast" (1787) was the second by a native American to be professionally produced. "May Day in Town, or New York in an Uproar" also was written in 1787. Tyler also produced novels and verse.

Tyler, WAT, leader of a 14th-century peasants' revolt, of whose early life little is known. In a time of severe economic difficulties among the English peasants, the rebellion was sparked by the imposition of a poll tax in 1379 and 1381. In the latter year, Tyler was chosen leader of a band of insurgents, which soon grew to the proportions of an organized force. This rebel army marched on London, pillaging and burning palaces and prisons, until King Richard II met with them outside the city wall and agreed to their demands, including the abolition of serfdom. Looting and murder continued, however, with Archbishop Sudbury of Canterbury one of the

victims. While meeting with the king at Smithfield on June 15, Tyler was killed by Sir William Walworth, mayor of London, for insolence to the king. The improvements promised Tyler were revoked, and many of the rebels were severely punished for continued efforts to resist the poll tax.

Tylor (*tī'lē'r*), SIR EDWARD BURNETT, anthropologist, born in Camberwell, London, England, Oct. 2, 1832; died in Wellington, Jan. 2, 1917. Educated at a Quaker school, he worked in his father's business until forced by ill health to stop, after which he traveled extensively. While in Cuba in 1856, he met the ethnologist Henry Christy, and the two made a scientific expedition to Mexico, out of which grew Tylor's book "Anahuac; or, Mexico and the Mexicans" (1861). Tylor served as professor of anthropology at Oxford (1896-1909) and was president of the Anthropological Inst. (1891-92). His work gave great impetus to the science in England. Among his writings are "Researches into the Early History of Mankind" (1865) and "Primitive Culture" (1871). He was knighted in 1912.

Tyl Ulenspiegel (*tīl oi'lēn-shpē-gel*) or EULENSPIEGEL. See *Eulenspiegel*.

Tympanum (*tīm'pə-nūm*), in architecture, a term for the space framed by a pediment in Greek and Roman art, or between a lintel and a half-round or pointed arch above in Romanesque and Gothic architecture. The space of the tympanum is used for sculptural, mosaic, or fresco decoration. In antiquity, the most famous tympanums are those of the temples of Aegina and Olympia and of the Parthenon in Athens. During the Middle Ages, all famous cathedrals, such as those of Chartres, Rheims, Amiens, Notre Dame of Paris, and Strasbourg, excelled in the sculptural decoration of their tympanums.

Tynan (*tī'nān*), KATHERINE, poet and novelist, born in Clondalkin, Ireland, Jan. 23, 1861; died in Wimbledon, England, April 2, 1931. The wife of Henry Hinkson, an author and lawyer, she became known also as Katharine Tynan Hinkson. She was a member of the Irish renaissance and a friend of such literary figures as W. B. Yeats, G. W. Russell (*Æ*), and J. M. Synge (*qq.v.*). Her book "Collected Poems" was published in 1931.

Tyndale (*tīn'd'l*), OF TINDAL, OF TINDALE, WILLIAM, reformer, born in Gloucestershire, England, ca. 1484; executed at Vilvorde, near Brussels, the Low Countries, Oct. 6, 1536. After studying at Oxford and Cambridge, he was ordained a priest (ca. 1521). His advanced views soon brought him into conflict with the clergy, and, in an effort to combat what he considered the corruption of the Church, he undertook a translation of the New Testament into English.

Unable to find a publisher in England, he went to Germany, visited Martin Luther at Wittenberg, and then settled in Cologne, where he began (1525) publication of his work. Interrupted by an injunction, he fled to Worms, where the edition was completed. Many copies were distributed in England, where it was condemned and suppressed as heretical. Cardinal



WILLIAM TYNDALE

Wolsey (*q.v.*) ordered Tyndale seized. Living in hiding, first at Marburg and later at Antwerp, Tyndale continued to enunciate the principles of the Reformation in such tracts as "The Obedience of a Christian Man" and "The Parable of the Wicked Mammon" (1528), both of which were denounced by Sir Thomas More; and "The Practice of Prelates" (1530), which attacked the Church and Henry VIII's divorce. His translation of the Pentateuch was published in 1530. At the instigation of Henry VIII, Tyndale was arrested in Antwerp in 1535, tried, and convicted of heresy. He was strangled at the stake, after which his body was burned.

Tyndall (*tīn'd'l*), JOHN, physicist, born in Leighlin Bridge, Ireland, Aug. 2, 1820; died in Haslemere, England, Dec. 4, 1893. Educated in England, he did advanced study (1848-50) at the Univ. of Marburg, Germany. He was elected (1852) a fellow of the Royal Society and appointed (1853) professor of natural philosophy at the Royal Institution of London, later succeeding his friend Michael Faraday (*q.v.*) as superintendent. With Thomas H. Huxley (*q.v.*), he explored the glaciers of Switzerland, and in 1872 he lectured in the U.S. and Canada. Tyndall's chief scientific contributions were his studies of magnetism, radiant heat, light, and acoustics. He was also successful in expounding difficult concepts for the nonscientific reader, as in his book "Fragments of Science for Unscientific People" (1871).

Tyndall became president of the Birmingham and Midland Inst. in 1877, and subsequently served as the scientific adviser of the lighthouse authorities and of the board of trade. He was a brilliant writer and effective lecturer. His writings, which were often in a popular vein, are numerous and deal with the results of his research in the field of radiant heat, magnetism, sound, light, electricity, and the properties of air and water.

Tyne (*tīn*), a river in the northern part of England, formed by the North and the South Tyne. The general course is toward the east, forming part of the boundary between Durham and Northumberland, and it discharges into the North Sea at Tynemouth. The length of the river from the junction is only 35 m., but it is an important highway of commerce and is navigable to Blaydon, about 18 m. The Derwent and the Team flow into it.

Type (*tīp*), a piece of metal or wood bearing on one end surface, usually in relief, a letter, figure, or other character so designed that it can be used in combination with other such characters for printing. Wood type is used only for very large types where the weight of blocks of solid metal would present difficulties in casting and handling. They are employed only for printing posters and extremely large headings in newspapers, etc., and the characters are engraved in the wood. Most type used today, however, is cast in an alloy composed of lead, tin, antimony, and copper.

Types used to be, and sometimes still are, made by first cutting a punch in steel and then driving this into a bar of copper or brass to form a matrix. This matrix was then placed in a steel form, called the mold, in which the types were cast. Many modern type foundries use a given mold for only one size of type. Since it never is, or can be, adjusted for any other size, the types a mold casts can be used with others cast by the same size mold, even in batches produced many years apart. Also, most foundries no longer make matrices by driving a steel punch into a brass bar. Cutting away the metal instead of compressing it gives a sharpness and depth unmatched by punched matrices. Therefore, the original design for a letter is engraved several inches high in a brass pattern plate. This, in turn, is used to govern an ingenious and complicated pantographic device called the Benton engraving machine to engrave the matrix for any desired size of the type.

Types are supplied to printers in assortments, called fonts. A font includes varying quantities of each letter of the alphabet, in capitals and small letters of the upright form called "Roman," capitals and small letters of a slanting form called *italic* or *oblique*, as well as figures and punctuation marks for each form. In many cases it in-

cludes also small capitals, which are shorter than the regular capitals and about the same height as the small letters. Usually there are also several signs and special characters called ligatures. These are two or more letters joined together on one body, as for example ff, fl, ffi, to effect a smoother appearance in composition. A complete font may therefore include 200 or more different characters.

The quantities of each of these characters are assembled in the font in accordance with the frequency of repetition of letters in ordinary English. The accompanying table shows the relative quantity of each small letter usually found in a Roman font when 100 *a*'s are furnished. Script and text faces vary from this schedule somewhat. Capitals come in almost the same relation to the *A* as the small letters do, but a given font generally has only about half as many capitals as small letters. However, different type designs, and different sizes of the same design, may depart from this rule considerably. The largest sizes often have as many, or nearly as many, capitals as small letters, while in the very small sizes used for masses of reading matter, capitals may number only one-third of the others.

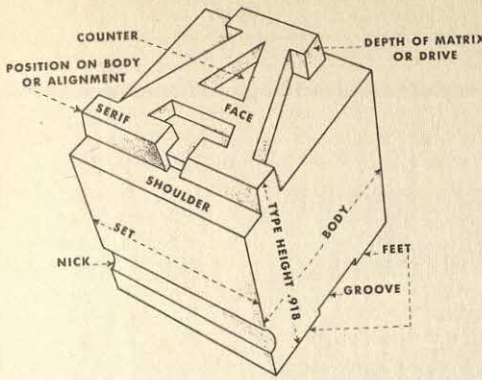
Relative Quantities of Letters in a Typical Font of Type

| | | | |
|-------|-------|-------|------|
| a—100 | h—66 | o—100 | v—24 |
| b—40 | i—100 | p—40 | w—40 |
| c—54 | j—24 | q—16 | x—16 |
| d—60 | k—24 | r—100 | y—40 |
| e—134 | l—66 | s—100 | z—16 |
| f—54 | m—54 | t—100 | æ—16 |
| g—40 | n—100 | u—54 | £—24 |

Until nearly the end of the 19th century, sizes of types were designated by names, but since different foundries slightly varied the sizes they produced under the same name, no founder's types were interchangeable with those of any other founder, and endless confusion resulted. In 1886, the U.S. Type Founders Assn. adopted what is now known as the American Point System, wherein a point is practically $1/72$ in., and the unit of type measurement is the pica, or 12 points, practically $1/6$ in. A column of type is said to be, say, 12 or 15 picas wide, meaning 144 or 180 points. In layman's measurement this would be 2 or $2\frac{1}{2}$ in. At the same time a uniform height for the type body was standardized at .918 of an inch. The accompanying tables relates the former names for the different sizes to their present-day point sizes:

| OLD NAMES | PRESENT SIZES | OLD NAMES | PRESENT SIZES |
|-----------|---------------|--------------|---------------|
| Brilliant | 4 points | Bourgeois | 9 point |
| Diamond | 4½ " | Long Primer | 10 " |
| Pearl | 5 " | Small Pica | 11 " |
| Agate | 5½ " | Pica | 12 " |
| Nonpareil | 6 " | English | 14 " |
| Minion | 7 " | Great Primer | 18 " |
| Brevier | 8 " | Paragon | 20 " |

It should be kept in mind that these point sizes refer strictly to the body of metal on which



Courtesy American Type Founders, N. Y.

ANATOMY OF TYPE

the letter is cast, not to the face of the letter itself. This body of the type must provide space for not only the height of the capital letter, but also below that for the descending letters *g, j, p, q, y*, and usually a slight shoulder of unused metal to separate the successive lines a trifle. Therefore, the height of small letters is only from $1/3$ to $1/2$ the point size of the body, and the capitals about $2/3$. These fractions vary somewhat from design to design.

The term *pica* (a measurement of length) is often incorrectly used interchangeably with the term *em* (a unit of area). An em is the square of any type size, and is generally employed by printers to measure the amount of composition (*i.e.*, type set) of a given type size included in a certain space. A pica is always 12 points, whether vertically or horizontally.

Loose foundry type is still set by hand very much as it has been for centuries. The compositor holds in his left hand a metal frame called the stick, and sets each letter upright in its successive order, upside down, but from left to right. When one line is completed, the next and succeeding ones are set in front of it until the stick is full.

The finest work is done by such hand composition, but for large masses of type required quickly, such as in setting newspapers and books, it is too expensive and time-consuming. Work of this nature is generally done by machines, such as the *linotype* and *intertype* (*q.v.*), operated by a keyboard to set up a line of matrices, from which is then cast a single-line slug. Of course, any correction in the line requires recasting the entire line. The Lanston *monotype* (*q.v.*) casts types in separate letters, like foundry type, and automatically composes it by keyboard direction. But any machine operation, while offering many economic advantages, often requires the misshaping of certain letters to conform to the dimensions of the standard matrices.

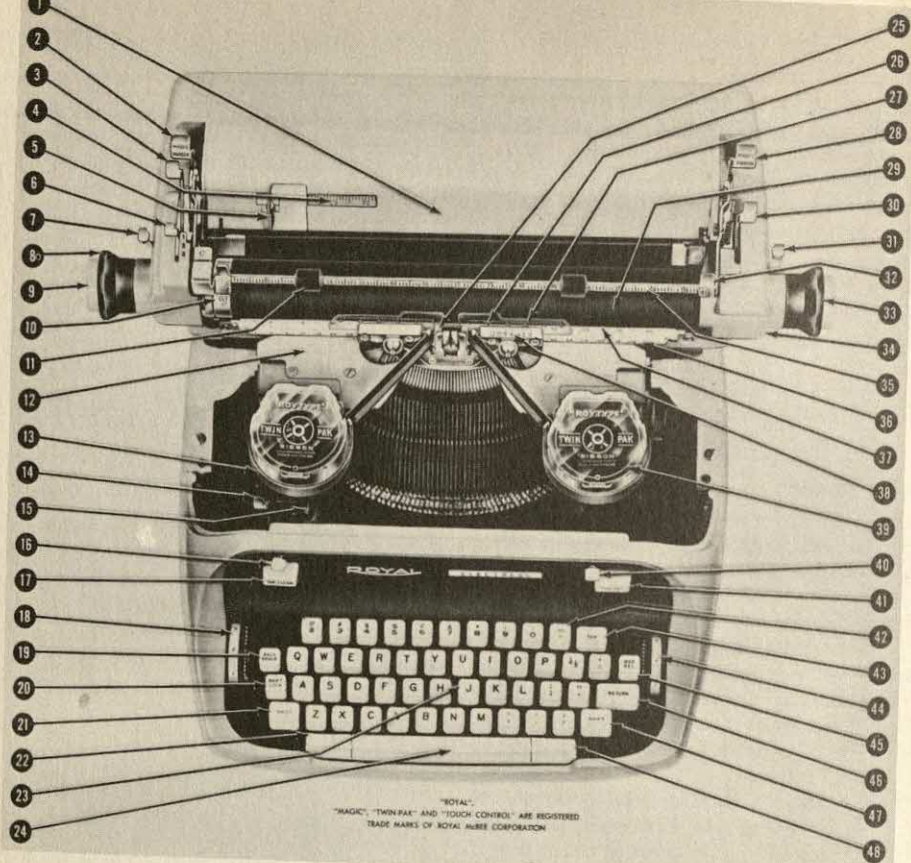
See also *Intertype*; *Linotype*; *Monotype*; *Printing*; *Typography*.

Typewriter (*tip'ri-tēr*), a machine for producing printed characters on paper by mechanical means, as a substitute for writing by hand. A large variety of typewriters is in use all over the world, but all agree in having a keyboard and metal type serving to impress the letters or symbols upon the paper, through the medium of an inked ribbon or inked types.

The first patent issued to an inventor of a typewriter was granted in 1714 by Queen Anne to Henry Mill, an English engineer, about whose invention little is known. W.A. Burt patented the first American typewriter in 1829, and the next important step forward was taken in 1843 by Charles Thurber of Worcester, Mass., who invented a machine that did excellent work but did not possess sufficient speed to bring it into general use. The next recorded effort was the invention of Pierre Foucault, a blind Frenchman, who in 1849 received a patent for a writing machine which printed embossed letters for the blind; several of these were used in institutions for the blind in various countries of Europe. During the 1850's several attempts were made, the most important of which was that of A.E. Beach of New York, who received a patent in 1856 for a machine which did good work but was too slow and wrote only on a narrow ribbon of paper.

The modern typewriter dates from 1867 when Christopher Latham Sholes, a printer of Milwaukee, Wis., assisted by Carlos Glidden and S.W. Soule, constructed a machine which was developed into the first practical typewriter in 1873. The most common modern typewriter is a bar machine on which type bars, activated by key levers, are arranged in a semicircle around a common printing point. Each letter is typed separately, a shift mechanism printing the capitals, and a fabric ribbon, usually cotton or silk, supplies the ink. Today's typewriter has attained a high degree of mechanical efficiency and its versatility has been constantly increased by the addition of attachments and improvements such as automatic margin control which greatly facilitates margin setting, personal touch control which adjusts key lever tension to the typist's preference, the 10-key decimal tabulator for ease in typing columns of figures, carriage widths ranging from 11 to 32 in., and a wide variety of typefaces. Most manufacturers offer many keyboard variations in addition to the standard keyboard. There are more than 5,500 keyboards available, including 69 languages and the signs and symbols of almost every occupation or profession.

There are several variations of the standard office typewriter, outstanding of which is the noiseless typewriter in which the principle of pressure is used to bring the type to the printing surface, rather than the impact principle used on



Courtesy Royal McBee Corporation, N. Y.

DIAGRAM OF AN ELECTRIC TYPEWRITER

Although the position of the parts of standard typewriters vary from model to model, they follow a pattern similar to the Royal Electress typewriter indicated here: 1 paper table; 2 left "magic" margin; 3 line finder; 4 paper guide scale; 5 paper guide; 6 line space selector; 7 left carriage release; 8 left cylinder knob; 9 variable line spacer; 10 line meter indicator; 11 paper lock rollers; 12 erasure shield; 13 ribbon holder; 14 ribbon wind lever; 15 ribbon reverse; 16 on-off power switch; 17 tab clear; 18 "touch control"; 19 back spacer; 20 shift lock; 21 left shift key; 22 half forward spacer; 23 pebble-edged keys; 24 space bar; 25 ribbon carrier; 26 ruling aperture; 27 transparent writing line scale; 28 right "magic" margin; 29 removable cylinder; 30 paper release; 31 right carriage release; 32 automatic paper lock; 33 right cylinder knob; 34 cylinder release (not visible); 35 paper lock scale; 36 printing point scale; 37 cylinder scale; 38 margin justifying scale; 39 "twin-pak" ribbon cartridge; 40 ribbon color and stencil control; 41 tab set; 42 repeat underscore and hyphen key; 43 tabulator; 44 impression control; 45 margin release key; 46 carriage return; 47 right shift key; 48 repeat forward spacer

standard machines. The portable typewriter, now manufactured with a standard keyboard, is much lighter than the office typewriter. The bookkeeping or accounting machine is another outgrowth of the standard typewriter and, in addition to printing, this machine adds or subtracts either vertically or horizontally. An electrically operated typewriter has been manufactured, although its high cost has so far prevented its wide-spread use.

The typewriter in its development has greatly influenced the scope of modern business. Creating a need for competent operators, the typewriter introduced a new skill, the "touch" system, now taught in public schools and in special commercial or secretarial schools; it has also given impetus to the entrance of women into the busi-

ness world, as the majority of typists in the Americas and Europe are women. A skilled typist is able to write at the rate of about 60 to 80 words a minute.

Typhoid Fever (*tī'foid fē'vēr*), in medicine, a specific infectious and contagious disease caused by general infection with the typhoid bacillus (*Eberthella typhi*). It is characterized by a continuous fever, involvement of the lymphoid tissues especially, with enlargement and often ulceration of the lymphatic tissue in the mucous membrane lining of the intestine. Enlargement of the spleen, rose spots on the trunk, diarrhea, and a variety of other severe constitutional disturbances are also present.

The infecting microbe can be found in the

blood, feces, and urine. Common sources of infection are unsanitary conditions brought about by poor disposal of bowel discharges and urine of infected individuals. Healthy carriers (persons who, without symptoms of a communicable disease, harbor and disseminate the specific micro-organisms) are common. Susceptibility to typhoid fever is general, although some slight natural immunity exists in adults. Permanent acquired immunity usually follows recovery from the disease. Artificial active immunity can be produced by use of typhoid vaccine (see *Vaccination; Serum Therapy*) which gives a high level of protection for about one year.

Typhoid fever occurs widely throughout the world regardless of age, sex, race, climate, or geography. Formerly epidemics occurred in many parts of the U.S., but now there are only occasional sporadic outbreaks in a few rural areas. Control and decrease of incidence of the disease have been brought about by widespread public health measures such as pasteurization of milk, proper sewage disposal facilities, sanitary water supplies, hygienic supervision of food handlers, prevention of fly breeding, and by widespread vaccination as in the army. Methods of control of the disease when an isolated case or two occurs include specific diagnosis by bacterial tests, isolation of the infected person or persons, concurrent disinfection of all waste products and articles used by the patient, and determination and eradication of the source of infection.

Typhoon (*tī-fōon'*). See *Storms*.

Typhus (*tī'fūs*), or SPOTTED FEVER, JAIL FEVER, SHIP FEVER, CAMP FEVER, HOSPITAL FEVER, WAR FEVER, BRILL'S DISEASE, an acute infectious disease transmitted sporadically from rat to rat or to man by the rat flea (*Xenopsylla cheopis*), and in epidemics from man to man by the body louse (*Pediculus corporis*). The specific causative agent is a microbe, called *Rickettsia prowazekii*, which is carried from the blood of the infected person or rat by the bite of the louse or the flea to the next victim.

The onset of typhus fever is variable, often sudden, with marked prostration, headache, chills, fever, and general pains. On the fifth or sixth day a generalized red, slightly raised and sometimes hemorrhagic eruption appears. The fever continues high, and delirium and other severe nervous symptoms are often present. The fever runs a definite course of about two weeks, terminating in the crisis and sudden drop of temperature. The disease is still highly communicable, if lice are present, until 36 hours after the temperature has become normal.

Susceptibility to typhus is general. One attack produces an immunity which is not always permanent. The disease has a widespread prevalence, and in the U.S. has occurred mostly in the Deep

Southern states. Louse-borne typhus occurs mostly in winter and spring, and flea-borne mostly in summer and fall. About two per cent of flea-borne typhus cases, and 20 to 40 per cent of the louse-borne cases, are fatal. Crowded and unsanitary conditions promote outbreak and spread of the disease, especially in times of war or famine. Treatment is purely symptomatic and supportive; rest, good nourishing food, and good nursing are highly important. Methods of control include isolation and concurrent disinfection (delousing and fumigation of patient, clothing, and bedding). Exposed susceptibles should be quarantined for 14 days after the last exposure. Immunization methods have been developed, but are not practical for generalized use.

Typography (*tī-pōg'rā-fy*), the art of printing with movable types. Before movable types were invented, however, much printing had already been done. Forms and colors, outlining ornamentations or pictures, were printed on vellum, paper, and fabrics; even individual letters had been engraved reversely on metal and impressions been taken therefrom by means of inks or dyes. That was done in China and Japan perhaps as early as the 2nd century A.D., certainly as early as the 6th century. In Europe, however, this technique of printing from cut or engraved stencils was not known. Books, playing cards, and pictures were reproduced only individually by hand until the 15th century. About the beginning of the 15th century, some printing was done from wooden tablets on which a picture with some accompanying text were cut. Sometimes even an entire text page was reproduced on such a tablet. The first prints from wooden tablets or blocks—called *Holztafeldrucke*—in Europe originated about 1420. Within a few years, whole books were made up of such blocks, and are now known as "block books."

About the middle of the 15th century, the decisive step was taken. Who was the European inventor of movable types is still a matter of controversy: some authorities attribute the invention to Johann Gutenberg (*q.v.*) of Mainz, *ca.* 1443; others, to Lourens Janszoon Coster (*q.v.*), of Haarlem, Holland, *ca.* 1440. In any case, not long after 1450 various people were printing not only in Mainz but also in Cologne, Augsburg,

SCHWABACHER FRaktur

This late Gothic type was developed, immediately after the invention of the printing press, late in the 15th century, directly from the hand-written letters of medieval manuscripts

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
1 2 3 4 5 6 7 8 9 0 ff fi fl ! & ? si ss ft

JANSON

The German printer Anton Janson (?-1687) produced the earliest attempts to create a fluid alphabet preserving the clear dignity of the type without its earlier heavy monumentality

Lübeck, Nuremberg, Strasbourg, and Bamberg. Printing began to spread in France, Holland, and Belgium, *ca.* 1470; despite the alleged invention by Coster, no Dutch books with earlier dates seem to be preserved. In Italy by 1480 there were already some 40 printing shops; the first was founded at the monastery of Subiaco in 1464. Venice soon became a center of artistically superior printing, especially through the workshop of Aldus Pius Manutius (*q.v.*) and his family, whose books, known as "Aldine" editions, are now important collectors' items. In England, printing was introduced by William Caxton (*q.v.*), who printed his first book, "The Dictes or Sayengis of the Philosophres," in 1477. Caxton had learned printing in Germany, probably at Cologne, and had already printed, at Bruges, Belgium, "The Recuyell of the Histories of Troye," which he himself had translated from the French.

In all these printing shops, the individual printers were not satisfied by the mere technical fact of the invention but very soon tried not only to multiply printed matter in a mechanical way but to create books of artistic beauty. The means to achieve this were the invention of individually shaped types and a well-balanced arrangement in layout and spacing. About the end of the 15th century competition between type designers became strong, and the recognized leaders were the Venetian and the Caxton schools.

All these early type faces were cut into metal. Gutenberg is supposed by some to have printed his first Bible with wooden types. Such types would have been roughly similar to the types used in the earlier block books, different only in being cut out as individual, movable letters. If wooden movable types were ever actually used—and most historians doubt that they were—they were quickly superseded by cast-metal types, both for durability and ease of producing. The greatest advantage, of course, was that one mold could produce an infinite number of replicas of each individual letter. Brass, lead, and copper were the earliest metals used.

The earliest types were Gothic characters, especially in Germany (noted for a tendency toward ornateness), and so-called Bastard Italian or Roman types. Other early type faces are the genuine Roman types and the so-called Burgundian types. All of these various type faces were developed from earlier styles of handwriting as used by 15th-century manuscript scribes. The Roman characters were the only ones modeled on the lettering of antiquity. Italic type, said to be designed in imitation of the personal handwriting of Petrarch (*q.v.*), was first used by Aldus Manutius.

Relatively early, Greek (1465), Hebrew (1475), and Arabic (1514) letters were cut; from the 16th century through the 18th, the most exotic alphabets were added to the treasury of printing types,

CASLON ROMAN AND CASLON ITALIC

William Caslon (1692-1766), the most important of 18th-century English type designers developed this alphabet from medieval type faces, making it more easily readable. Caslon italic is characterized by the emphasized difference from the Roman characters in this script, a quality which is not shared by other *italics*

A B C D E F G H I J K L M N O
P Q R S T U V W X Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z
A A B B C C D D E E F F G G
H I J K K L M M N N O P P Q Q
R R S S T T U U V V W X X Y Y Z
a b c d e f g h i j k l m n o p q r s t u v w x y z

A B C D E F G H I J K L M N O P
 Q R S T U V W X Y Z
 a b c d e f g h i j k l m n o p q r s t u v w x y z
 ä ö ü & f f f l

BODONI

The type of the Italian printer Giambattista Bodoni (1740-1813) follows most closely of all the famous 18th-century types the examples of Roman antiquity as preserved in stone inscriptions. It is characterized by the emphasis of the difference between the straight and curved lines

from Armenian (*ca.* 1600) to Runic (1611); and today, of course, type faces exist for every written language in the world, including many dead languages. About 1500, it began to be possible to print musical notation; before that time, the individual notes had been filled in by hand between printed lines.

Some printers have achieved artistic immortality by the beauty of their work. A few of these include Gutenberg himself and Johann Fust (or Faust), of Mainz; Anton Kronenberger, of Nuremberg; William Caxton, of Westminster; the family of the Aldi at Venice; Johan Froben, of Basel, in the 15th century. In the 16th century the greatest printers were Christopher Plantin, of Antwerp; the family of the Elzevirs at Leyden, and the family of the Estiennes at Paris. Although interest in the creation of the new types tended to decline later, some of the succeeding printers are noteworthy. There was, *e.g.*, Johann Michael Fleischmann (1701-86), active in Germany and Holland, who besides his printing letters perfected the printing of music. His Italian counterpart was Giambattista Bodoni (1740-1813), whose 143 alphabets enriched European type fonts immensely and today remain among the most used type faces. In England, the 18th century produced William Caslon (1692-1766), who created not only beautiful English Roman types but also cut Oriental alphabets; and John Baskerville (1706-1775). In

the 19th century, William Morris tried to revive the art of printing (which had declined from an art into a mere "business" with little consciousness of design) with his Kelmscott Press; his books still represent a very high point in 19th-century printing. The leading typographer of our time in the U.S. was Frederick Goudy (1865-1947), who created numerous alphabets and influenced the type designers of our generation very strongly. Thanks to Goudy and a few others (such as W.A. Dwiggins and the Grabhorn brothers, Edwin and Robert) typography in the U.S. and England (Stanley Morison and Sir Francis Meynell) has been raised, largely in our own times, again to the status of a fine art. See also *Type*.

Tyr (*tír*), in Scandinavian mythology, a son of Odin and a brother of Balder. He was the god of war and fame, corresponding to the Mars of the Romans, and was prayed to by the heroes for victory. See *Tuesday*.

Tyrannosaurus (*tý-răn'ô-sa-rûs*), a genus of dinosaur which was found in Montana and Wyoming. The largest dinosaur known was 47 ft. in length and was carnivorous.

Tyrant (*tí-rant*), the name of a ruler in ancient Greece. Such an official was not necessarily despotic and cruel as the term implies in modern times. Tyrants usually were highly respected and powerful citizens, who, by stratagem or by force of necessity, assumed the government of a city or a state. In many cases they were men of wisdom and their government was highly beneficial from social and commercial standpoints. These rulers appear in nearly all periods of Greek history, but they were most numerous in the 7th and 6th centuries B.C. Later the tendency of the times induced powerful families to assume authority and rule over the people in an unjust and oppressive manner. From this circumstance came the modern word tyrant, which designates a cruel and unjust executive, no matter whether he is a

UNGER FRaktur

The German printer Friedrich Unger (1753-1804) tried to overcome the poor legibility of the Gothic faces, and succeeded in creating the most readable and most beautiful Gothic alphabet

A B C D E F G H I J K L M N O P Q R
 a b c d e f g h i j k l m n o p q r s t u v w x y z á ö ú ñ ñ ñ ñ ñ ñ ñ ñ
 S T U V W X Y Z
 1 2 3 4 5 6 7 8 9 0

usurper or a legally constituted king or potentate.

Tyrant Flycatcher (*fl'kă-chēr*) or **FLY-CATCHER**, the common name for a large family of American birds. As the name indicates, they are adept at catching insects on the wing. Their practice is to dart from their perch after a passing insect and then return to their post. They have strong bristles at the corners of the mouth, sometimes as long as the bill, that form a sort of basket which aids in capturing their prey. A few species are at home on the ground, but most of them are predominantly arboreal. About 350 species are known, ranging from Alaska to Patagonia, the West Indies, and the Galapagos Islands. They are relatively small birds, from half the size of a house wren to larger than the American robin. Their colors are frequently dull, but the males of many species have bright yellow under parts, and one is vermilion below and on the crest. Numerous species have a concealed crown patch of white, yellow, orange, or red. Their songs are unmusical but often characteristic of the particular species. The flycatchers of the Old World, to which the name properly belongs, are only distantly related to the American group, which is allied to the thrushes and Old World warblers.

Tyre (*tīr*), a city of ancient Phoenicia, on the eastern shore of the Mediterranean Sea, about 90 m. n. of Jerusalem. Next to Sidon (*q.v.*), Tyre was the oldest city of Phoenicia. It consisted of a mainland settlement and two rocky islands directly offshore. Its era of commercial prosperity began in the 11th century B.C. and reached its highest peak in the two centuries from 1000 to 800 B.C. Colonists from Tyre settled in Spain, Sicily, Sardinia, and Carthage, and Tyrian merchant fleets sailed as far as India and Brittany. King Hiram, who ruled the city from 970 to 936 B.C., was a friend of Solomon and David and supplied timber and workmen for the construction of Solomon's temple in Jerusalem. There is an Old Testament account by the prophet Ezekiel of the wealth and luxury of Tyre at this time (Ezekiel 27).

Tyre withstood a 13-year siege (585-572) by Nebuchadnezzar. In 332 Alexander the Great besieged and conquered the city. He built a causeway between the islands and the mainland, which still stands, and restored much of the city's former commercial importance. Tyre was never again free from the empires which followed Alexander's, but for some centuries it continued to enjoy a measure of prosperity through its trade in fine textiles, metalwork, and purple dye. In 1124 the Crusaders captured Tyre and made it one of the chief cities of the kingdom of Jeru-

salem. In the later Crusades it changed hands repeatedly between the Mohammedans and the Christians and was several times destroyed. The site of Tyre is now partially occupied by the Lebanese town of Es Sur.

Tyrol (*tī-rōl'*) or **TIROL**, a province (area, 4,884 sq. m.) of western Austria, bounded by Vorarlberg, Bavaria, Salzburg province, Italy, and Switzerland. Almost all of the province is mountainous; the Tyrolean Alps are famous for their picturesque beauty and constitute a major tourist attraction. The province is traversed from west to east by the Inn river, on which the capital, Innsbruck, is situated. Most of the Tyrol's population lives in the Inn Valley. East Tyrol is separated from the main part of the province by a narrow corridor belonging partly to Italy and partly to Salzburg province. Subsistence farming, dairy farming, and the tourist trade are the chief sources of income. Silver mines, an important asset in the Middle Ages, are now little worked, but there are large deposits of lead, zinc, and salt in the province, as well as rich sources of hydroelectric power. Population, 1951, 426,499.

In 15 B.C. the Romans conquered the Celtic tribes inhabiting the Tyrol and annexed the region. After being ruled by various counts and bishops in the early Middle Ages, the area came under Austrian rule in 1363. In 1805 it was ceded by treaty to Napoleon's ally Bavaria, but when France and Austria went to war in 1809, the Tyrolean peasants, under the leadership of Andreas Hofer (*q.v.*), rose in revolt. After heroic resistance they were overwhelmed by numerically superior French and Bavarian troops and suffered severe reprisals at the hands of the French. In 1815 the Congress of Vienna restored the province to Austria. After World War I, South Tyrol, the region lying south of the main Alpine range and the Brenner Pass, was awarded to Italy, to form the Italian region of Trentino-Alto Adige. Because about one-half of the inhabitants of South Tyrol are of German-speaking stock, this transfer was a source of considerable friction in the period between the two World Wars. Hitler and Mussolini tried to solve the problem by large-scale shifts of population, but after World War II many of the evacuated South Tyroleans returned to their old homes. In 1947 the Italian constitution granted autonomy to the region, with full protection for minority groups.

Tyrrhenian Sea (*tī-rē'nī-ān sē*), a body of water lying between the mainland of Italy and the islands of Sicily, Sardinia, and Corsica, which form its southern and western boundaries. It is a part of the Mediterranean Sea.



U (*yōō*), the fifth vowel and the 21st letter of the English alphabet. The Phoenician alphabet did not have this letter and, to supply the deficiency, it was originated by the Greeks. Originally *V* was the capital form of the letter *u*, but the two were differentiated in the 15th century, although they were used interchangeably for some time afterward. The true sound of *u* is that of *oo* in *cool*, *tool*, *wood* and *woo*. This sound is still retained in most European languages. It corresponds to the French *ou* in *tour*. The letter has a *short* sound, as in *fun*, *tun*, and *cut*, and a *long* sound, as in *due*, *sue*, and *mute*.

U-235. See *Atomic Bomb*.

Ubangi (*û-bāng'[g]ê*), a river of central Africa, sometimes known as the Makua in its upper course and the Mobangi in its lower course. It has a course of 1,400 m., and it is the chief northern tributary of the Congo. The Ubangi with the Bomu and Congo rivers forms the northwestern boundary between the republics of Congo and Chad and the Belgian Congo.

Ubangi-Shari (*û-bāng'[g]ê shār'rê*), a former overseas territory of France, which, under the Fifth Republic of France, was proclaimed the Central African Republic. It is a member of the French Community. See *French Equatorial Africa*.

Ucayali (*ōō-kā-yā'lê*), or UCAYALE, a river of Peru, the longest headstream of the Amazon, regarded by many as the true source of that river. It is formed by a number of branches in the western slopes of the Andes. The general course is toward the north, joining the Amazon near Nanta. The portion under its own name has a length of 1,000 m. and its main branch, the Apurimac, added to it makes its course equal to about 1,500 m. The Ucayali River is the chief outlet of Peru toward the northeast, being navi-

gable for small steamships a considerable distance. The valley is rich in fine forests and fertile soil.

Udall (*ū'dal*), NICHOLAS, author, born in Hampshire, England, in 1505(?); died in 1556. He studied at Corpus Christi Coll., Oxford, where he became a fellow. In 1534 he became master at Eton and 20 years later was made headmaster of Westminster School. His reputation is based chiefly upon "Ralph Roister Doister," a comedy written after the Roman style. It was first published in 1566, 10 years after his death, and is the earliest comedy in English now extant.

Udall, STEWART LEE, government official, born in St. Johns, Ariz., Jan. 21, 1920 (the town was founded by his grandfather, a pioneer Mormon missionary). Udall served as a B-24 gunner in World War II and afterward was a basketball star at the Univ. of Arizona. He was admitted to the bar in 1948 and practiced law in Tucson until 1954, when he was elected to the U.S. Congress, where he was a strong advocate of Western reclamation projects. In 1961 he became Secretary of the Interior.

Udder (*ūd'ēr*), name for the milk gland when pendant; it has several nipples, as in the cow.

Udine (*ōō'dê-nā*), a town in the Italian department of Venezia, capital of the province of Udine, 85 m. N.E. of Venice. The Romanesque cathedral contains work by Giovanni Martini, a pupil of Raphael, and the church of Santa Maria has frescoes by Tiepolo. The residence of the patriarchs of Aquileia is noteworthy. Silk, leather, hats, and gloves are manufactured. In 983 it was given to the patriarch of Aquileia, and, in 1420, became Venetian. In World War I it was the seat of the headquarters of the Italian army, but fell to the Austrians after Caporetto (*q.v.*) in October 1917, and was not recaptured until Nov. 3, 1918.



THE UFFIZI

The Palazzo Vecchio in the background

During World War II it was captured by the Allies in May 1945. Population, ca. 65,000.

Ufa (*oo'fä*), the capital of the Bashkir Autonomous Soviet Republic, at the junction of the Ufa and Belaya Rivers, about 325 m. N.E. of Samara, in the Ural Mts. of Russia. Copper-smelting, saw mills, flour mills, brewing and distilling are carried on. Lumbering and agricultural activities are important. Founded by the Russians in 1574, Ufa was seized by Czechoslovak troops in 1918, and became the capital of the Bashkir Republic in 1922. Population, 1959, 546,000.

Uffizi (*oo'f-fer'sè*), a palace in Florence, Italy. It was built by the Medici family between 1560 and 1580 and contains one of the most valuable art collections in the world.

Uganda (*ü-gän'dä*), a British protectorate in East Africa, bounded on the north by Sudan, west by Congo (Léopoldville), south by Tanganyika, and east by Kenya. The area is ca. 94,000 sq. m.; the administration is located at Entebbe. Lakes George, Kioga, and Salisbury and parts of lakes Victoria, Edward, and Albert lie within the protectorate, together with part of the Nile, whose source is at Ripon Falls. There is steamer service on Victoria, Kioga, and Albert lakes, and on the Nile. A railroad runs from Kampala, the chief trading center, to Mombasa on the Indian Ocean, with branch lines into the interior. There are about 7,000 m. of good roads. Cotton and coffee are the principal crops; tobacco, groundnuts, oilseeds, and sugar are exported. Copper is the most valuable mineral commercially. The country is

full of big game. The natives are chiefly Bantu. The territory is administered by a governor, with an executive council and a legislative council which includes African members. Administratively, the territory is divided into four provinces: Eastern, Western, Buganda, and Northern. Buganda is a 600-year-old kingdom, which retains its traditional Kabaka or king and Lukiko or parliament. Uganda participates in the East African Common Services Organization (see *British East Africa*). Population, 1959, 6,523,628, including 11,000 Europeans.

Uhland (*oo'lánt*), JOHANN LUDWIG, poet, born in Tübingen, Germany, Apr. 26, 1787; died there Nov. 13, 1862. After studies at Tübingen Univ. he entered upon a successful practice of law. Studies of old French and German manuscripts in Paris (1810-11) stimulated his preference for poetry and literature. In 1829 he became professor of the German language and literature at Tübingen Univ., but resigned four years later to devote himself to literature and politics. He was made a member of the Frankfurt parliament in 1848, where he attained a wide influence as a member of the liberal party. His first literary work was published in 1815, entitled "Selected Poems." These works prove him definitely a representative of the Romantic school, whether they are ballads or patriotic songs written to express German sentiment in regard to the war against Napoleon; many of them are still popular. About 75 editions of his "Selected Poems" have been published. His dramas include "Ernest of Swabia" and "Louis the Bavarian," and his essays, "Myths of the North" and "Walter."

Uhlans (*oo'länx*), a term meaning lancers, the light cavalry introduced to Western Europe by the Tartars. They were maintained as an adjunct to the armies of many countries until World War I, at which time trench and tank warfare made them obsolete.

Uintah Mountains (*ü-in'tä moun'ünz*), an elevated range of the Rocky Mountain system, in the northeastern part of Utah. They trend in a general direction from east to west and join the Wasatch Mts. some distance west of Salt Lake City. The drainage is chiefly by the Green River and its tributaries. Gilbert Peak, the highest summit, has an elevation of 13,685 ft.

Ukulele (*ü'koo-lä'le*), a small guitar with four strings. Originally Portuguese, it was long a favorite stringed instrument in Hawaii and was introduced into America and Europe by native Hawaiian singers. The Hawaiians use wood of the koa tree to make the best instruments, but now mahogany and other woods are used. Four gut strings are used, the A, E, C and G, and the tuning is to the *natural C* arrangement.

Ukrainian Soviet Socialist Republic (*ŭ-krań'i-qń*), second largest of the Union of Soviet Socialist Republics (U.S.S.R.) in population and economic development, formed in 1919. Its area of 170,998 sq. m. is slightly smaller than that of France and about the same as Sweden. It is bounded by the Azov and Black Seas on the south, Rumania and Poland on the west, White Russia on the north, and the R.S.F.S.R. (Russian Soviet Federated Socialist Republic) on the east. Four-fifths of the population are Ukrainians; the rest include Russians, Jews and Moldavians. The capital is Kiev, with a population of about 850,000. Other important cities are Odessa, Kharkov, and Krivoi Rog.

Since 1928, the Ukraine has become one of the leading industrial regions, the Donetz coal field being world famous. There are coking coals, mercury, polymetallic ores and salt in the Donbas, the easternmost portion of the Ukraine; high-quality iron ore at Krivoi Rog, in the elbow of the Dnieper; and one of the world's largest deposits of manganese at Nikopol, on the river's west bank. The greatest industrial projects include the Dnieper power dam, largest in Europe, partially destroyed during World War II; the aluminum, electric, steel and other related industries in its immediate vicinity, including tractor works, heavy machinery plants, locomotive works, turbine and electrical generator works, and a harvester combine factory; and the 150 coal mines and numerous steel mills of the Donbas. Although the manufacturing industries were evacuated during the retreat of the Red army in 1941, the coal and steel industries remain, and new plants utilizing their products are being built to occupy the sites of those which were evacuated. Before the German invasion, the output of Ukrainian industry was 10 times as large as in 1913, and its steel industry ranked fourth in the world. During World War II much of the heavy industry of the area was moved east to the Ural area, where it could more easily be defended. Since the end of the war, however, the area has once more been industrialized, partly through the use of equipment taken from Germany and Austria.

Before World War II, the Ukraine was famous as the largest wheat-producing section of Russia. Modern farm machinery was used extensively in all phases of Ukrainian agriculture. Northwestern Ukraine is cattle country, but also grows potatoes, rye, and oats. The area around Kiev produces hogs and wheat, as well as three-fourths of the Soviet crop of sugar beets. In the open steppes of the south, grain is the most important crop, with some cotton grown near the shores of the Black Sea. Stock raising is also carried on. The short and mild winter makes it possible to cultivate fruit trees and grape vines in the south.

Considerable advance has been made in education in recent years. Annual school enrollment totals about 6,000,000. There are scientific research institutions for higher education as well as the universities of Kiev, Kharkov, Odessa, Stalino, and Dnepropetrovsk. Ukrainian is the official language of the republic. The Ukraine was one of the early members of the U.N. and was admitted to that body's Security Council in 1947. Population, *ca.* 39,000,000. See also *Union of Soviet Socialist Republics*.

Ulcer (*ŭ'l'sēr*), an open sore or state of dissolution of the tissues upon either an internal or an external surface of the body. It is a local degeneration commonly due either to infection or to deficient blood supply to the area. *Varicose ulcers* occur in the presence of severe or long-present varicose veins (*q.v.*), usually on the lower legs. *Diabetic ulcers* occasionally occur on the extremities or digits of those suffering with severe diabetes, due to a combination of poor circulation, poor resistance to infection, and favorable medium of bacterial growth because of high sugar content of the blood. There are many types of ulcers of the skin occurring in the tropics caused by fungus infections which are very resistant to treatment. An *indolent ulcer* is one with a firm elevated edge and a soft, weeping, nongranulating center, occurring usually on the legs. It may be due to arteriosclerosis (hardening of the arteries) and resultant poor circulation. A *rodent ulcer* is a malignant or cancerous ulcer of the epithelium, usually of the face, which spreads, invades, and destroys all local tissues unless properly treated by surgery and X-ray. Multiple ulcerations of the lining of the small bowel are characteristic of typhoid infection. Ulcerations of the large bowel lining are common in severe cases of amebic dysentery and mucous colitis. Perhaps the most commonly known ulcer is the *peptic ulcer*, which is a local erosion of the lining of the stomach or duodenum by excess gastric juice, especially hydrochloric acid, excreted by the stomach. This is usually treated by enforcing rest, mental calm, and special diet, but occasionally perforation of the stomach wall necessitates surgery.

Ulfilas (*ŭ'l'fī-lās*), or ULPHILAS, Gothic scholar and missionary of Christianity, born in a region north of the Danube, settled by the Visigoths, about 310; died in Constantinople in 383 A.D. He was probably the son of a Goth father and of a Cappadocian woman who was carried into captivity by the Goths. He studied the Gothic, Hebrew, and Greek languages, and in 341 was consecrated bishop. The barbaric people of his race expelled him from their settlements, but he retired with a number of converts to Moesia, where he operated successfully for 30 years. He devised a Gothic alphabet after that of the

Greeks, translated most of the Bible into the Gothic, thus raising his Teutonic tongue to a level of learned scholarship, and extending interest in Christianity. His version of the Holy Scriptures—although only fragmentary—is now kept in the Univ. of Upsala.

Ulm (*ölm*), a city of Germany, 45 m. s.e. of Stuttgart. It occupies an elevated site on the Danube and has extensive railroad facilities. Fine bridges cross the Danube and unite the city with New Ulm, a town in Bavaria. The chief building is the Münster, a Protestant cathedral, having seating capacity for 10,000 people. It is 475 ft. long and 165 ft. wide. The tower is 530 ft. high, the highest church structure in the world. Before World War II manufactures included machinery, woolen and linen cloth, leather, and ships. Ulm occupies the site of a Roman town. Since the Reformation a large majority of its people have been Lutherans. In 1802 it became a part of Bavaria, three years later was the scene of a noted battle between Napoleon and the Austrians, and in 1810 was made a part of Württemberg. During World War II, Ulm was captured by the French in 1945, and was included in the American Zone of Occupation. Population, ca. 75,000.

Ulna (*ül'nä*), in anatomy, the bone on the inner side of the forearm.

Ultramarine (*ül-trä-mä-rēn'*), a beautiful pigment of a blue color, valued for its durable quality. It is obtained from the mineral lazulite, or lapis lazuli, and contains lime, sulphuric acid, silica, alumina, soda, sulphur, iron, and chlorine. Formerly it was obtained only from lazulite, which is found in Chile, Persia, and Siberia, but it is now produced on a commercial basis and is less expensive. Painters use it both for oil and water colors. The value of this pigment consists in being both attractive and permanent.

Ultramontanism (*ül-trä-mōn'tā-nīz'm*), the theory of papal supremacy over the Roman Catholic Church. The view, which had existed in essence before the 19th century, became a particularly acute issue in 18th- and 19th-century politico-ecclesiastical history. The pope, in the ultramontanist view, is superior to, and independent of, the general councils and the source of all jurisdiction within the Church. The view was opposed by the Gallicans, in France, and by the Febronians, in Germany. Final recognition of the doctrine was accomplished at the Vatican Council (*q.v.*) of 1870. See also *Infallibility*; *Pope*; *Roman Catholic Church*.

Ultraviolet Rays (*ül-trä-vi'ô-lēt rāz*), rays which are outside the visible spectrum. Important in medicine, they are electromagnetic waves too short to be seen by the human eye. Sunlight contains variable amounts of ultraviolet rays, most of which are filtered out by the earth's atmosphere, so that at high altitudes they occur in

greater intensity. There is less ultraviolet light in the tropics than in the Arctic, less in summer than in winter, and less in morning and evening than at midday. See also *Infrared Radiation*.

Ulysses (*ü-lýs'ēz*), in Greek, *Odysseus*, King of Ithaca, famous leader of the Greeks in the Trojan War. He was the husband of Penelope and the father of Telemachus. It is reputed that he was living happily with his family in Ithaca at the time Helen was carried away by the Trojans. Having both wisdom and astuteness, he did not desire to leave his happy home for an expedition of uncertain duration, and accordingly feigned madness by plowing the seashore with a horse and an ox. The shrewd Palamedes exposed his deception by placing his infant son in the furrow, whereupon Ulysses quickly turned aside the plowshare to save the child. He joined the Greek fleet with 12 ships, and soon became noted for his valor and wisdom. After the death of Achilles, he and Ajax contended for the armor of the fallen hero, which Ulysses won. He not only invented the wooden horse which deceived the Trojans, but was one of the Greeks who concealed themselves on the inside and took an important part in winning the city. After the final capture of Troy he sailed for his native land with his 12 ships and his return voyage, which covered a period of 10 years, is the subject of the *Odyssey* of Homer. His first strange adventure occurred when his ships were driven to the land of the Lotophagi (lotus eaters), where his sailors ate of the lotus fruit and lost all desire to see their native country and home again. Ulysses had them tied and carried back to the ships. After this they visited the island of the Cyclops, where they were imprisoned in the cave of Polyphemus. This giant ate six of his companions, but Ulysses finally made him drunk with wine brought from the ships and, putting out his one eye, escaped safely.

The next notable adventure of the company was on the island of Aeolus, where Ulysses received a bag filled with favorable winds as a gracious gift of the gods. His sailors opened it at an inopportune time and the ships were again driven to the island, where all but one of his ships were destroyed by cannibal giants called Laestrygonians. Escaping on his one remaining ship, he sailed safely to Aeaea, where Circe, the sorceress, temporarily changed his companions into swine. He passed the island of the Sirens in safety by having himself tied to the mast, while the ears of his followers were filled with wax to prevent their being seduced by the enchanting music of the Sirens. He passed the dangers of Scylla and Charybdis in safety, but his companions killed some of the cattle of Helios at Trinacria while he slept, and a great storm arose and drowned all on board except himself. He



ULYSSES AND THE SIRENS

From a Greek vase painting

was carried in safety to the island of Ogygia, where he lived with the nymph Calypso, who promised him immortality if he would wed her. However, he effected his escape on a raft and finally returned to Ithaca, having been away from home for 20 years. He reached the abode of Penelope in disguise and found that suitors for her hand had wasted his substance and occupied his palace, but his son, Telemachus, and Minerva aided him in putting them to death. He died 16 years after returning to his home. See *Homer*.

Umbelliferae (*ŭm-bĕ-lif'ĕr-ĕ*), an extensive family of herbs and shrubs, so named from the shape of the umbels or clusters of flowers and fruit. They are found in both hemispheres, but are most numerous in the cool regions. Some writers apply the name *parsley* to the entire family. Most species are characterized by hollow stems and flowers grouped in umbels. Oil and resinous substances are derived from the leaves of many plants of this family; the odor of many is pleasing, while in others it is disagreeable. The roots contain starch and sugar. Many are poisonous and some yield medical properties of value; such as ammoniac and asafoetida. The species generally known and cultivated include the caraway, celery, parsley, parsnip, carrot, coriander, anise, dill, and fennel.

Umb (*ŭm'bĕr*), a mineral pigment of an olive-brown color when in a raw state, which, when burned, takes on a reddish tint. It is composed of ochreous earth and manganese, and is obtained from natural deposits or by artificial preparation. The best grade is known as *Turkey umber* and is obtained in Cyprus. Umb is useful in oil and water-color painting, being durable and forming a good body.

Umbilical Cord (*ŭm-bil'i-kal kôrd*), in anatomy, the cord which, before and during the act of birth, connects the fetus with the placenta (the after-birth) of the mammals.

Umbrella Bird (*ŭm-brĕl'ă bird*), the name of a singular bird found in South America, so

called from its parasol-like crest. This bird is allied to the crows. It has a stout bill, moderately large wings, a naked neck, and a chattering voice. It is peculiar not only for its crest, but likewise for its beardlike growth of feathers that project downward from the neck. Two species have been described.

Umbrella Tree (*ŭm-brĕl'ă trĕ*), a small magnolia with large white fragrant flowers. The name is derived from the arrangement of its dense foliage, which makes it an efficient shade tree. It is a kind of China tree, native of Persia and India, widely cultivated in the warmer regions of the world.

Umbria (*ŭm'brĭ-ă*), a division of ancient Italy, lying between the Adriatic Sea and Etruria. It was situated north of the Sabine country. The region included the Upper Tiber and the Rubicon and in the early period was restricted to the ridges of the Apennines, but at a later time it developed into a powerful state. Its principal cities were Sena Gallica (now Sinigaglia), Pisaurum (Pesaro), Fanum Fortunae (Fano), and Spolegium (Spoleto). The Umbrians and Etruscans were subjected by the Romans in 308 B.C., but they joined the Samnites in a formidable struggle against the Romans at Sentinum, where they met their final defeat in 295 B.C. The name Umbria is now applied to a province of central Italy, southeast of the province of Tuscany and north of the province of Latium. Spoleto is the capital and Perugia is the chief city. Its area is 3,282 sq. m. Population, ca. 765,000.

Umlaut (*ŭm'lout*), in philology, especially in Teutonic languages, e.g., German, the change of a vowel by assimilation with a succeeding syllable or letter. It is often indicated by substituting two dots (¨) over the vowel, e.g., German *Mann* (man) becomes in the plural *Männer* (men); *Gut* becomes in the plural *Güter*.

Unalaska (*ŭn-ă-lă-s'kă*), one of the larger islands of the Aleutian chain, situated southwest of the Alaska Peninsula. It is 75 m. long and from 10 to 25 m. wide. The area is about 1,100 sq. m. Deep-cut fiords indent the shore and much of the interior is a barren and treeless tableland. Makushin, an active volcano, has an elevation of 5,961 ft. The inhabitants consist chiefly of Aleuts and are mostly at the towns of Unalaska and Iliuliuk. Fishing, sealing, and trading are the principal industries. Population, ca. 400.

Unamuno (*ŭn-ă-mŭn-ŭn*), MIGUEL DE, philosopher and writer, born in Bilbao, Spain, Sept. 29, 1864; died in 1936. Educated in Madrid, he was professor of Greek and Spanish literature and language (1891 ff.) and rector (1901-14) at the Univ. of Salamanca. One of the leaders of the revolutionary movement, he attacked vigorously the dictator Primo de Rivera and was banished

(1923) to Fuerteventura (Canary Islands). Although pardoned in the same year, he lived in voluntary exile in Paris (1924-30) and did not return to Spain before the establishment of the republic (1931). One of the foremost Spanish authors, he wrote poems, novels and essays. His works include "The Life of Don Quixote and Sancho Panza," an essay advocating quixotism as form of life; "Essays and Soliloquies" on Spanish problems and Spain's position in European culture; "Tragic Sense of Life," which is generally considered his masterpiece; and "The Agony of Christianity."

Unanimism (*û-nân'im-iz'm*), a term in literature and philosophy for a movement which has flourished since ca. 1905. Although mainly represented in literature by one man, Jules Romains (*q.v.*), some of its characteristic traits appear earlier in the works of Baudelaire, Verhaeren, and Walt Whitman (*qq.v.*). A group of French philosophers, among them Durkheim, tried to formulate the underlying essence expressed in the works of the above-named writers. Briefly, unanimism means the concept that the human soul is inseparably interwoven with the soul of the universe and that humanity as a whole is composed of groups which are composed of individuals. All the individuals stand in certain relations to each other, thus creating the groups, exactly as the groups together create humanity. Thus the writer must describe the groups by describing the individuals, but these individuals themselves are unessential. It is their relationships that creates the essence of life, and therefore the individual characters have, for instance, not to be followed up in a novel; instead, they may vanish and reappear. Out of this network of relations the true picture of life will evolve.

Uncas (*ûng'kas*), an American Indian chief, born in the Pequot settlement of Connecticut about 1588; died near Norwich, Conn., in 1682. Following a disagreement in the Pequot tribe, he was expelled and proceeded east from Lyme, Conn., where he reorganized the Mohegan tribe. Being friendly toward the English settlers, he formed an alliance with the colonists against the Pequots in 1637, and, being successful, he secured a portion of the conquered territory. He defeated Miantonomo, chief of the Narragansetts, in 1643, and brought him as a prisoner to the colonial authorities. Miantonomo was killed by a brother of Uncas, after having been tried on a charge of causing disturbances among the Indians. The close friendship of Uncas with the colonists caused the Pocumtucks and Mohawks to make an attack upon the Mohegans. Uncas would have been captured by the hostile Indians except for the timely arrival of Thomas Leffingwell, of the British army; as a mark of gratitude Uncas gave the latter the tract of land now

forming the site of Norwich. He was a constant friend of the English, always remaining faithful to his treaties. A monument was erected to his memory at Norwich in 1825.

Uncial Letters (*ûn'shal*), a kind of letters used in preparing Greek and Latin manuscripts during the early part of the Middle Ages. These letters are more nearly round in form than capitals and may be said to combine some of the features of the small characters with those of capital letters. The custom of using uncial letters is thought to have originated from the greater difficulty of making the angular capitals; ease and speed seem to have contributed to the popularity of the rounder script. These letters were the prevailing style from the 6th to the 8th century.

Uncle Sam (*ûng'k'l sām*), a colloquial term used as a personification of the U.S., originating from the initials U.S. Typifying the nation, Uncle Sam is represented as a tall old man with flowing white hair and beard. His costume consists of a high hat, embellished with stars and stripes, as in the national flag, and striped trousers. In cartoons he symbolizes the U.S. as John Bull does England, and Marianne, France.

Unconsciousness (*ûn-khōn'shūs-nēs*), a state of physical and mental torpor, as opposed to the normal state of conscious life. See *First Aid*.

UNCLE SAM

Poster by James Montgomery Flagg

Courtesy National Archives



UNCONSCIOUS, THE

Unconscious (*ün-kōn'shūs*), THE, in psychology, that part of the mental process which is beyond the reach of conscious awareness. See *Psychiatry; Psychoanalysis; Psychology*.

Unction (*üngk'shūn*), the custom of anointing a part or the entire body with oil, as with the oil of olives. Anciently the practice was resorted to as a luxury or to promote health, but it gradually developed into a religious custom. In the Roman Catholic Church it is known as the *Extreme Unction*, and the Council of Trent declared it to be a sacrament. The oil used is blessed by the bishop in a ceremony which takes place once each year on Maundy Thursday, and the oil so blessed is used during the year. In the administration of the sacrament the priest dips his finger in the oil and anoints the sick person by applying it upon the eyes, ears, nose, mouth, hands, and feet. At each place of application he makes the form of the cross and repeats, "Through this holy unction, and His own most tender mercy, may the Lord pardon thee whatever sins thou hast committed by sight [etc.]. Amen." It is customarily administered only to dying or extremely ill persons.

Underground Railroad (*ün'dēr-ground*), the name used in the U.S. before the Civil War to designate the system adopted by people in the North to aid fugitive slaves in escaping from their masters. Many thousands of fugitives were thus directed to the northern boundary, into Canada and beyond the reach of the Fugitive Slave Law. The plan designated certain routes and listed houses at convenient intervals, known as *stations*, and the whites conducted or conveyed the fleeing Negroes from one point to the next. Most of the fugitives were brought from Virginia and Kentucky through Ohio and Pennsylvania.

Underground Railway. See *Subway; Tunnel*.

Undershot Wheel (*ün'dēr-shōt*). See *Wheel*.

Underwood (*ün'dēr-wōōd*), OSCAR WILDER, Congressman, born in Louisville, Ky., May 6, 1862; died in Fairfax County, Virginia, Jan. 25, 1929. He studied in Louisville and at the Univ. of Virginia and practiced law at Birmingham, Ala. In 1895 he was elected to Congress as a Democrat and served until 1915, when he was elected to the Senate. He served in that body until 1927. He was Democratic floor leader of the House and chairman of the House Ways and Means Committee from 1911 to 1915 and was Democratic leader in the Senate, 1921-23. The Underwood tariff, a law to lower the tariff, was passed by Congress in 1913. Underwood was mentioned as a candidate for President in 1912 and 1924.

Undine (*ün-dēn'*), in German mythology, a water nymph. Undines were supposedly female.



Norwegian Official Photo

SIGRID UNDET

By marrying a mortal and bearing a child, one could gain a soul. The legend was used by Friedrich de la Motte-Fouqué (1777-1843) in a romantic tale in 1811, and Gustav Albert Lortzing (1801-51) wrote (1845) an opera on the subject.

Undset (*ōōn'sēt*), SIGRID, novelist, born in Kalundborg, Denmark, May 20, 1882; died in Lillehammer, Norway, June 10, 1949. The daughter of a noted archaeologist and lecturer at the Univ. of Oslo, she was educated in Oslo but rejected an opportunity to attend the university. At 16 she took a job in the office of an engineer, remaining there for ten years, during which time she wrote her first two novels. She was married (1911-22) to A. C. Starsvåg, a Norwegian painter. In 1924 she became a Roman Catholic and for the rest of her life made a close identification between her religion and her writing.

During World War II she was active in war work in Norway (her eldest son was killed in the guerrilla warfare following the German invasion), and she was forced to flee to Sweden and later to the U.S. She returned to Norway in 1945.

Noted particularly for her historical novels of medieval Norway, Sigrid Undset is best known for the trilogy "Kristin Lavransdatter" (1920-22), consisting of "The Bridal Wreath," "The Mistress of Husaby," and "The Cross." Another major work is "The Master of Hestviken" (1925-27), including "The Axe," "The Snake Pit," "In the Wilderness," and "The Son Avenger." Later novels are "Ida Elisabeth" (1932), "The Faithful Wife" (1936), and "Madame Dortha" (1939). Other works include the autobiographical "The Longest Years" (1934); volumes of essays, including "Men, Women, and Places" (1938); and several books for children. She was awarded the 1928 Nobel Prize for literature. Her novels are particularly notable for their treatment

of character and for the depth of their emotional understanding.

Unemployment (*ũn-ẽm-ploi'mẽnt*), in economics, the state of being without work because of personal disqualification other than illness or physical handicap or because of economic disorder. See *Economics*; *Labor*; *Labor Legislation*; *Social Security*.

UNESCO (*ũ-nẽs'kõ*), abbreviation for United Nations Economic and Social Council, an agency of the United Nations (*q.v.*).

Ungava (*ũng-gã'vã*), a region in the northeastern Province of Quebec, Canada. It is bounded by Labrador on the E., the Eastmain River on the S., Hudson Bay on the W., and Ungava Bay and Hudson Strait on the N. Comprising ca. 350,000 sq. m. in area, it was made part of Quebec, as New Quebec, in 1912; a further boundary demarcation gave some of it to Labrador in 1927. It is rich in minerals but sparsely populated.

Ungulata (*ũng-gũ-lã'tã*), a name applied in older classifications to an order or superorder of mammals. The ungulates are now divided into two orders: the Perissodactyla, in all of which the number of toes on each hind foot is either one or three; and the Artiodactyla, in which the number of functional digits on each foot is usually either two or four. The perissodactyls, which include the horse, zebra, tapir, and rhinoceros, were most abundant in the older geologic epochs. The extinct giant rhinoceros, *Baluchitherium*, standing about 18 ft. high at the shoulder, was the largest of known land mammals. The artiodactyls, which include pigs, peccaries, hippopotamuses, camels, deer, giraffes, cattle, antelopes, sheep, and goats, are the dominant hoofed mammals at the present time. Man's economic and social development through the ages has been closely tied to these two great orders of mammals. From primitive times to the packing-house and dairy-products era of today these animals have provided food of the most diverse kinds. Beef, mutton, and pork are common meats; goat, cattle, horse, and camel milk is drunk, and the excess becomes cheese of many varieties. The trends of world history have been directly influenced by man's ingenuity in the use of ungulates for transporting himself and his products. Horse cavalry and camel corps have won battles. The great trade routes of the Eurasian world were traced by beasts of burden. Pack animals also include llamas, donkeys, and yaks. The wool of sheep and of the camel family clothe many men. The skins of cattle, pig, and deer are made into leather. Animal breeders are constantly seeking to improve the diverse qualities of domesticated ungulates. Research programs range from increasing the yield of milk, meat, and wool to producing faster race horses.

Unicorn (*ũ'nĩ-kõrn*), a mythical animal having a single horn issuing from the middle of



Courtesy of the Metropolitan Museum of Art, N. Y.

UNICORN IN CAPTIVITY

Seventh tapestry in the series "Hunt of the Unicorn," early 16th century

the forehead. It is mentioned by a number of ancient Greek and Roman writers. The unicorn is spoken of by Aristotle and Ctesias, both of whom describe it as native to India. It is said to have been about the size of a horse, with a white body, a red head, blue eyes, and a large horn on the forehead. Such an animal is not known to naturalists and it is thought that the legendary tales of unicorns may have arisen from careless observers viewing an antelope in profile, or seeing antelope having one horn broken off by fighting or by accident. Others connect the story with the rhinoceros. The unicorn is pictured on the British coat of arms. Elsewhere it has been used variously as a symbol of purity, strength, and ferocity. The narwhal is sometimes considered the sea unicorn. A class of sheep which are native to Nepal, in Asia, have a varying number of horns, and may have been mistakenly identified as unicorns.

Uniform (*ũ'nĩ-fõrm*), a term designating a form of clothing which characterizes the wearer as belonging to a certain organized group. It is worn to indicate membership in the group and allegiance to it. Although military uniforms, which in present usage are usually implied by this term, came in use only about the 14th century, other forms of uniforms have existed from the very beginning of civiliza-

tion. In primitive societies, groups of people distinguished themselves by adopting certain ways of painting or tattooing their bodies or specific forms of headdress. More direct predecessors of the modern uniform were the habits worn by the monastic orders and the orders of knighthood. In ancient armies, individual armor was worn, rather than uniforms. The military uniform developed with the introduction of standing armies after the Crusades. It was adopted as a means of identifying the troops of various states when, in wartime, such states contributed soldiers to a larger army.

The first uniforms consisted merely of badges or scarves. While soldiers were mercenaries and were hired and dismissed at will, considerable individual variation in uniform was permitted even in unified groups. From the middle of the 17th century, however, great armies were composed of members of single nations, and the uniform became essential. See also *Army*.

The first full uniforms corresponded in tailoring to ordinary civilian dress and differed only in being of a specified color. From the end of the 17th century the design of the costume itself developed independently, as, for instance, the cut of the coat and the style of the boots. At first the color was merely symbolic of the outfit to which a soldier belonged. Later, decorative purposes directed the choice of color combinations and of style. These colors and styles, however, were sometimes impractical. The red coats of the English in the 18th century and the red trousers of the 19th-century French soldier proved too easily recognizable by the enemy. With the development of 20th-century warfare and more sophisticated weapons, functional considerations came to outweigh other factors in the choice of uniforms. The clothing which camouflaged the soldier best, protected him best against varieties of climate, and gave him the greatest mobility was considered the best type of uniform. See also *Camouflage*.

Union (*un'yūn*), a city in northwestern South Carolina, seat of Union County, 68 m. N.W. of Columbia. It is served by the Southern Ry. and other railroads. Union's manufactures include textiles, hosiery, pulpwood, and cottonseed oil. The area produces cotton and fruits. Union was founded in 1791. Population, 1950, 9,730; in 1960, 10,191.

Union City, a city in northeastern New Jersey, in Hudson County, on the Hudson River, opposite New York, N.Y. Railroad facilities are provided by Jersey City and other adjoining communities. Industries include printing, food processing, and the manufacture of clothing and textiles, embroidery, automotive parts, electrical equipment, and chemicals. Union City is part of the Jersey City standard metropolitan statistical

area (pop., 1960, 610,734), which includes all of Hudson County. In 1958 the city had a value added by manufacture of \$48,068,000. Union City was formed in 1925 by the merger of the towns of West Hoboken and Union Hill. West Hoboken, dating from 1658 and settled by French and Dutch, became a town in 1884. Union Hill, founded in 1851, became a town in 1864. Population, 1960, 52,180.

Union of South Africa (*ōv south ā'f'ri-kā*), a federal union of the self-governing British colonies of Cape of Good Hope and Natal with the Boer colonies of Transvaal and Orange Free State (*qq.v.*). The union came into being in 1910 and was a self-governing dominion of the (British) Commonwealth of Nations until 1961, when it withdrew and formed the Republic of South Africa (see *South Africa, Republic of*).

The constitutional basis of the union was the South Africa Act, passed by the British Parliament in 1909. Despite the defeat of the Boers by the British in the Boer War (*q.v.*) and the strong efforts of the ministries of Louis Botha and Jan Christiaan Smuts (*qq.v.*) to weld the British and Boers into one people with a close tie to the British empire, the Boers (Afrikaners) continued their resistance. They mounted a rebellion during World War I and in 1924 voted James B. M. Hertzog's Nationalist party into power. Severe labor troubles in the Rand's gold mines marked the period, but generally the country prospered. Agricultural problems were dealt with, and industrial expansion—notably in steel—was begun, to avoid overdependence on gold-mining. In 1920 the union acquired administrative control of South-West Africa by mandate of the League of Nations.

Because of Hertzog's sympathies with Nazi Germany, he was forced out of office in 1939, and Smuts returned as premier. In World War II the union joined the Allies, and its forces served overseas.

Postwar industrial expansion aggravated racial problems. Nonwhite South Africans outnumbered the whites five to one, and the lack of job opportunities made migratory workers out of half the native population. Under Prime Minister Daniel F. Malan (1948-54) and his successors, the Nationalist party's apartheid laws, requiring complete separation of the races, were fully and often brutally enforced. It was this policy and the strong opposition to it by the other members of the Commonwealth, that triggered the withdrawal of the union and establishment of the republic.

Union of Soviet Socialist Republics (*sōv'-ē-ēt sōsh'ā-līst rī-pūb'lik's*), a federation of 15 republics—the Russian Federated, Ukrainian, Byelorussian, Azerbaijan, Georgian, Armenian, Kazakh, Turkmen, Kirghiz, Tadzhik, Uzbek, Mol-

UNION OF SOVIET SOCIALIST REPUBLICS

davian, Estonian,¹ Latvian,¹ and Lithuanian¹ Soviet Socialist Republics (*q.q.v.*), some of which are subdivided into autonomous republics and regions and into national areas. Comprising four constituent republics when it was formed in 1922,² the U.S.S.R. had 16 in 1940. The number was reduced to 15 in 1956, when the Karelo-Finnish S.S.R. was incorporated into the Russian F.S.S.R.

DESCRIPTION: The U.S.S.R. is the largest country in the world and covers one-sixth of the world's land surface. In Europe, it borders on Norway and Finland in the northwest, on Poland in the west, and on Rumania in the southwest. In Asia, its political border stretches from Turkey in the west, to Iran and Afghanistan, and to Mongolia and China in the east. The U.S.S.R. shows a great variety of natural scenery and, accordingly, has many different climates, except tropical. Its highest peaks are in the Caucasus Mts. in Europe and in the Pamir and Tien Shan Mts. in Asia. Some of the largest rivers in the world traverse the Union, including the Volga and Dnieper in Europe and the Amur, Lena, Yenisei, and Ob in Asia. There are many large lakes and archipelagos, and water transport and water power play important roles in the Soviet economy. Large canal systems are an outstanding feature of the country; they include the White Sea-Baltic Sea and the Volga-Don canals. The total length of railroad trunk lines is 75,000 m., which ranks the U.S.S.R. in second place, after the U.S., which has over 220,000 m.

POPULATION AND AREA: The total estimated area in 1957 was 8,600,000 sq. m., and the total population, according to a 1956 Soviet estimate, was 200,000,000. The U.S.S.R. added immense territories and populations on its western and eastern frontiers as a result of its aggressive actions in 1939 and 1940 and as a result of World War II. These include: Lithuania, Latvia, Estonia, Bessarabia and North Bukovina (from Rumania), Eastern Poland and part of East Prussia, Subcarpathian Ruthenia (from Czechoslovakia), East Karelia (from Finland), Kurile Islands (from Japan), and Sakhalin (from Japan).

The capital of the U.S.S.R. is Moscow. Other leading cities are Leningrad, Kiev, Kharkov, Baku, Gorki, and Odessa.

Inhabitants: The U.S.S.R. has within her borders a very great number and variety of separate nationalities, tribes, and ethnic groups. The different peoples that make up the Soviet Union speak 150 distinct languages and dialects and practice about 40 different religions. The main medium of communication is Great Russian, which is taught in all schools and which is grad-



Courtesy Sovfoto

NORTHERN CAUCASUS

Containing some of the highest peaks in Europe

ually becoming the common language of the entire country. Racially, the population is roughly eight-tenths white, about one-tenth yellow-brown, and the rest intermediate. Asiatic peoples of the U.S.S.R. are of Paleo-Asiatic or Mongolian derivation, belong to various contingents of the yellow-brown human complex, have more or less Mongoloid features, yellowish to medium-brown skin, and straight black hair. All of these groups are already considerably admixed with Russian whites, and these mixtures are gradually increasing. They present many grades and variants in stature, head form, and in all other features.

The population may be roughly divided into a few major ethnic stocks: Slavs, Caucasians, Turko-Tartars, Finno-Ugrians, Paleo-Asiatics, and various Iranian, Mongolian, Jewish, German, and Greek peoples.

Of the U.S.S.R.'s population, 150,000,000 scattered throughout the country are *Slavs*. They consist mainly of Great Russians, Ukrainians, and White Russians. Their languages are closely related to each other and all belong to the eastern branch of the Indo-European family of languages. The Great Russians of Velikorussia and the White Russians of Byelorussia in physical type show traces of admixture with the Nordic peoples on one hand, and with Finnish, Turkish, Tartar, and Iranians on the other. Generally they tend toward blondness, have brown or blue eyes, broad shoulders, and stocky physique. The Ukrainians are taller and more brunette.

The *Turko-Tartars* number about 21,000,000. They include the Chuvash, Tartars, and Kalmuks of the Volga River basin; the Uzbeks, Turkomans, Kazakhs, Tadzhiks, and Kirghiz of Central Asia; the Yakuts, Oriots, Buriats, and Mongols of Siberia; and the Azerbaijanians of Transcaucasia. The Turko-Tartar stock represents a great variety of physical types. The Tartars of the Volga River basin represent a mixture of

¹ The Soviet annexation of the Baltic states has not been recognized by the U.S.

² For a description of Russia prior to the establishment of the Soviet Union, see *Russia*.

Bulgarians, Turks, Mongols, and Russians. The Siberian group is strongly Mongoloid. The Central Asiatic peoples are dark-skinned or yellow-skinned, all oriental in appearance. The prevailing religion of the Turko-Tartars is Mohammedanism, although some of them, like the Chuvash and the Yakuts, were converted to the Orthodox Church. Others, like Buriats, practice Lamaism.

The next most important ethnic groupings are the peoples of the *Caucasus* and *Transcaucasus*. The Japhetic group among the Caucasian peoples consists of Georgians, Khevsurs, Mingrels, Svan, Cherkess, Abkhazians, Kabardinians, Ossets, Digor, Tarour, Lezghin, Avars, Kazikumuk, Chechens, and Karatai. Ethnically closely related to this group are other peoples of this area, the Armenians, Aissor, Kurds, Tats, and Azerbaijani Turks. The Caucasian peoples are, as a whole, dark and of mixed pigmentation. They represent a blend between a local Alpine racial nucleus and several kinds of Mediterraneans. The Azerbaijanians are predominantly Turko-Tartar in origin. All these peoples are mixed in their religious faith, some being Mohammedans, others Russian Orthodox, and the Armenians adhering to their own branch of Christianity.

The *Finn-Ugrians* (about 5,000,000), are located principally along the middle and upper Volga and Kama rivers. They represent the remnants of the primitive native population that once covered much of central and eastern Russia. For a long time they have been in the gradual process of amalgamation with the Russian population. These peoples may be divided into three main groups: Western, Eastern, and Arctic. The eastern Finn-Ugrians consist of Mordva, Cheremiss, Votjak, and Vogul. The Westerns are the Baltic Finns, Suomi, and Karelians. The Arctics are Lapps, Zyrians, Nency, and Ostiaks. Most of them are Russian Orthodox in religion except for the Finns, who are Protestant. The physical type is strongly Mongoloid.

The *Paleo-Asiatic* tribes in the northeast of Siberia show great physical, cultural, and linguistic affinities with the American aborigines. In religion, they are predominantly polytheistic nature-worshippers and devotees of Shamanism. The tribes are Chukchee, Koryak, Kamchadal, Chuvantzy, Yukagir, Gilyak, Eskimo, and Aleutians. The Ainus of Sakhalin are a relic of a very ancient ethnic stock.

The Jewish population numbered about 5,300,000 in 1941 and about 2,000,000 in 1957, after the slaughter by the Germans in World War II. The Jews live mainly in the Ukraine and Byelorussia, with comparatively few in Asia. Between the early 1920's and 1939, the U.S.S.R. sought unsuccessfully to create a Jewish autonomous region in Birobidjan (q.v.).

Soviet policy toward the numerous nationalities has shifted considerably since the mid-1930's. The early emphasis was upon helping the various national groups to develop or improve their own languages, literatures, and cultures, but recently a new integral nationalism—Soviet patriotism—has been emphasized. This trend is based on the thesis that Socialism has been achieved and the Soviet Union is a Socialist nation—a stable group of people with a common language, territory, economic life, and psychological pattern.

RELIGION: Most of the inhabitants of the Russian empire in 1917 were members of the Russian Orthodox Church, but there were ca. 20,000,000 Moslems, several million Roman Catholics (in the part of Poland then under Russian rule and in Lithuania), several million Jews, and several hundred thousand Protestants, mostly Lutherans and Baptists.

The Soviet government, in 1917, set out to destroy the religious organizations and all faiths. Its policies have shifted from time to time, but the goal has remained unchanged. In January 1918 the Soviet government nationalized the property of all churches. It separated Church and State, made civil marriages sufficient, and began open persecution of priests and other individuals with religious beliefs. Between 1921 and 1927, the government removed all Church influence from education, prevented the publication of religious books and papers, and tried to split the Orthodox Church in particular. When the drive for industrialization and collectivization was launched in 1927-28, the campaign against religion was intensified. Freedom of worship was granted, but not freedom of propaganda or religious education, and the powers of the churches were restricted in every way possible. The 1936 constitution, however, gave the clergy the right to vote and their children the right to education, and icons were allowed. During World War II, restrictions were considerably relaxed as the government appealed more to traditional Russian nationalism; and in 1943 the Orthodox Church was given greater power over its own affairs, although it remained under firm Communist control. At the same time, seminaries were restored, the patriarchate was re-established, antireligious propaganda declined considerably, taxation of Church land ceased, and more places of worship were allowed. Since World War II, the Orthodox Church has been used by the government as an instrument for expansion of Russian influence in Eastern Europe and as an instrument of anti-American political warfare.

The effectiveness of the antireligious campaign is difficult to define. All religious bodies except the Orthodox Church have, in effect, been destroyed, and the Orthodox Church is a prisoner of the government. In the 1950's, there were in

the U.S.S.R. only about one-tenth as many churches and one-sixth as many clergymen as before the Revolution. Estimates generally agree that about 30 per cent of the population still hold religious beliefs, and the Communist press has recently shown concern about the influence of religion upon the young in particular.

EDUCATION: The Communists place great emphasis upon education and technical training. In the 1920's and 1930's, especially, they believed they could remake man, with a new Soviet citizen to be created under "Socialist humanism." The 1920's were marked by considerable freedom and experimentation, with progressive education and coeducation. At the same time, many special schools were established, notably in factories, in a determined effort to eliminate illiteracy. The various youth organizations, the Pioneers (age 10-16) and the Komsomols (age 14-36), are in large part educational, or at least indoctrinating, units. From the point of illiteracy, Communist results have been impressive—the rate was reduced to 51 per cent in 1926 and to 10 per cent in 1940; it has probably decreased since that time.

Elementary education is free and compulsory from the ages of seven to 17. High-school education is compulsory in cities, but a fee is generally charged. There are schools of three types, offering a four-year, a seven-year, and a ten-year curriculum. There are thousands of trade, technical, and agricultural schools.

MOSCOW UNIVERSITY

The 6,000-room newer building of the university is in a different part of Moscow from older buildings

Edo Koenig, from Black Star



The number of elementary and secondary schools rose from 104,610 in 1914 to 175,000 in 1941. At the same time, the number of pupils rose from 7,236,000 to 25,000,000 and to about 40,000,000 in 1956. Students in technical secondary schools numbered about 1,000,000 in 1952 and about 1,600,000 in 1956. The U.S.S.R., in 1956, had about 800 universities and other institutions of higher learning, with an enrollment of about 650,000. The national government, the various republics, and many city governments maintain musical, art, and theatrical schools.

Scientific and other research is a part of the Five-Year Plans. The Acad. of Sciences, which has more than 60 institutions, has general direction over important research. Soviet achievements in the sciences have contributed significantly to the growth of Soviet power. According to 1956 Soviet statistics, there were 223,893 persons classified as scientists.

LITERATURE AND THE ARTS: The rise of the Communists to power brought an irrational denunciation of the literature and art of the past, until the 1930's, when a renewed appreciation of Russian tradition and of Russian achievements began to be manifest. The principal pre-Revolutionary authors who survived the Revolution held divergent views on Communist rule. Leonid N. Andreev, who lived in Finland, remained outside the borders of the U.S.S.R., as did Ivan Bunin, the Nobel Prize winner; on the other hand, Alexei N. Tolstoy and A. I. Kuprin, who were expatriates for a time, returned to active work within the Soviet Union. Maxim Gorky, a close friend of Lenin, who best bridges the gap between the pre-Revolutionary and Soviet eras, was forced by ill health to live in Italy until his death in 1936.

The tumult and chaos and spirit of the Revolution are perhaps best expressed in the brief poem, "The Twelve," by Alexander Blok, which effectively reveals the people's faith in the ideals of the 1917-18 upheaval. Vladimir Mayakovsky and Sergei Essenin take their place with Blok as distinguished poets interpreting the ideals of the Revolution. The principal novelists in the 1920's were Nikolai Ostrovsky, who wrote "Born of the Storm," and A. Serafimovich (pseudonym of A. S. Popov), who contributed "The Iron Flood." Mikhail Sholokhov's "And Quiet Flows the Don" is probably the finest novel about the Revolution and the civil war.

During the 1920's, literature and the arts enjoyed the same kind of freedom and independence as the educational system did at that time. Freed from the bonds of the old system, expressionism and symbolism flowered in literature. Painters and architects showed a tendency toward the ultra-modern, and the ingenuity of S. M. Eisenstein in films helped transform movies

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into a fine art. The Communist party encouraged and fostered activity on the part of the workers, many of whom during this period of the prolet-cult (education for the working class) wrote novels and poems, and even plays, about the new industrial society.

When the Soviet drive for industrialization and collectivization was begun in 1928, however, the arts fell under the same severe control as the rest of Soviet life. The emphasis on authority and on Russian history and tradition in the 1930's helped to paralyze the arts or at least helped to drive artists back into the established forms. Thus, the current form and style of Russian ballet much resembles that current in the Russia of pre-Revolution days. The same emphasis on the national heritage is apparent in Soviet architecture since the 1930's, when experimentation with



Van Sprang, from Black Star

RARE PRIVATE ENTERPRISE

Selling flowers on the street

modernism was ended. Soviet music, distinguished by names such as Shostakovich and Khachaturian, has experienced the same travail. Generally, art in the U.S.S.R. has been conventional, much like the art of Victorian England.

Under the policy of Socialist realism, literature and the arts must be socially useful and educational, and the artist must participate in the daily activities of the community, drawing his inspiration from the life of society.

Rumbles of dissent against Communist directives began to be heard after the death of Stalin in 1953, and Soviet novelists in particular began to demand that the arts be humanized. Ilya G. Ehrenburg's short novel "The Thaw" (1954) reflects this criticism of party controls, as does Vladimir Dudintsev's "Not by Bread Alone" (1957). Although party spokesmen immediately reprimanded the authors who were critical, restive-



Courtesy Sovfoto

COLLECTIVIZED HERDING

These peacefully grazing sheep are part of a collectivized flock in the Altai Mt. region

ness among Communist authors did not die out.

ECONOMY: In the U.S.S.R., all the economic resources, including the land, the mineral deposits, and all industry, are owned and controlled by the government.

Agriculture: In contrast to its wealth in minerals, the U.S.S.R. suffers from a shortage of good agricultural land. In 1956, 482,000,000 acres were under cultivation; 300,000,000 acres were devoted to grain production. Other crops, such as potatoes and vegetables, are grown in quantity. Cattle, pigs, and sheep are raised. To increase grain output, the government recently turned over to cultivation more than 85,000,000 acres of virgin lands in Siberia, Kazakhstan, and other eastern territory.

The predominant feature of Soviet agriculture is collectivization. There are some 85,000 collective farms, comprising ca. 20,000,000 peasant households. A collective farm cultivates from 3,700 to 7,500 acres on the average. In addition, there are more than 5,000 state farms, large enterprises, which are cultivated by workers hired by the government.

From pre-Revolutionary days, only about 100,000 individually owned farms remain; these people are not allowed to hire labor. Members of collective farms, too, own small plots of land; they may sell or use the output from these plots for themselves.

Minerals: The mineral wealth of the Soviet Union is tremendous. The principal minerals are zinc, phosphates, iron, manganese, copper, pyrites, gold, oil, coal, and lead. Platinum, calcium salts, and peat are also found. Moreover, geologists are constantly engaged in a successful search for new deposits, and it is an accepted theory that the Soviet Union will soon be completely independent of outside sources of supply for minerals and fuels. The postwar addition of Eastern Eu-

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rate of increase in the gross national product was about 6.5 per cent.

By 1957, the Soviet Union had become the second-largest industrial power in the world, and its gross national product in that year was somewhat more than one-third that of the U.S. This economic power provided the base for undiminished Soviet military strength.

The rapid growth of Soviet economic power was accompanied by a planned geographical decentralization of industry. In 1913 almost all industry was concentrated in a few districts of European Russia, even though they were far distant from their main sources of fuel and raw materials. Today, the principal industries are widely scattered, and new industrial centers are



Courtesy Sovfoto

OIL WELLS AT BAKU

Center of the major oil deposits of the U.S.S.R.

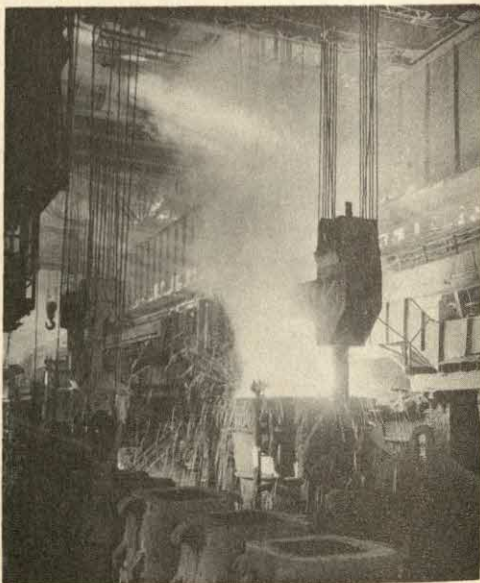
rope to Soviet control has fortified the Soviet position, for this area has enormous deposits of many important minerals, particularly uranium and coal.

The mineral deposits are scattered over the U.S.S.R. Petroleum is centered in the Baku area, although large deposits are also exploited at Grozny in the northern Caucasus, at Emba on the north shore of the Caspian Sea, and in a region between Kuibyshev on the Volga and the Urals. Gold is mined in the Urals and in eastern Siberia, as well as in Kazakhstan, which is one of the most important centers of nonferrous metallurgy.

Forest land occupies over 40 per cent of the total area of the U.S.S.R., and the timber industry is important. The hunting of fur-bearing animals is another noteworthy industry in areas where timber is heavy.

Industry: In 1928 the U.S.S.R. launched its first Five-Year Plan (*q.v.*), an unprecedented program of industrialization and collectivization, with a decided emphasis upon heavy industry in all of the successive plans. By 1940, industrial output was 5.8 times that of 1927, or of 1913, which roughly equaled that of 1927. The gross national product between 1928 and 1940 increased at an average annual rate of between 6.5 and 7 per cent, and the average annual rate of increase for industry was *ca.* 15 per cent. (The Russian economy in the two decades before World War I expanded at an annual rate of *ca.* 5.7 per cent.)

The immense destruction caused by World War II not only slowed down Soviet progress but faced the nation with appalling problems in reconstruction and rehabilitation. Indeed, it was not until 1948 that the 1940 goals had again been achieved. Progress over the decade 1945-54 was rapid, though not so rapid as the prewar rate. Industrial production increased at an average annual rate of about 10 per cent, and the average



S. Gendelman, from Sovfoto

AZOVSTELL MILL, STALINO REGION

Tapping steel at this open-hearth furnace in the Ukraine is largely an automatic process

being developed east of the Urals.

The cost of this industrialization has been staggering. The cost in lives has been vast; an estimated 5,000,000 died of starvation early in the 1930's because of the ruthlessness with which collectivization was carried out. A second cost has involved the political freedoms of the Russian people, which have been sacrificed by the party to economic growth. Forced labor has been introduced, with perhaps 15,000,000 individuals in labor camps at any one time. Finally, the living standard has been kept low. Indeed, food consumption per capita in 1955 was slightly lower than in 1913 and in 1928. The living standard of the working class in 1950 was between one-sixth and one-eighth that of the average American

worker. Moreover, there has apparently been a slight decline since 1955. The dramatic repudiation in the spring of 1957 of the Soviet national debt, or of Soviet bonds, represented a practical demonstration of the monetary contribution of the Soviet people to their government's economic and military program.

Recently, evidence multiplied that the Soviet rate of economic growth was slowing down, a fact which led to a drastic reorganization of industrial management and the decentralization of many industries into 92 regional units, replacing previous management from Moscow. In addition, agricultural production was still lagging behind expectations.

Foreign Trade: Foreign trade was nationalized in 1918. It is as thoroughly planned and controlled as any other part of the Soviet economy. During the first Five-Year Plan (1928-32), the government planned to increase considerably both exports and imports, in order to assist in re-equipping and expanding industry. Largely because of the depression, however, and the fall in world prices, exports in 1930 and 1931 amounted (in value) to only two-thirds those of 1913. Soviet trade in the 1920's and 1930's generally involved the importation of finished manufactured goods and the export of timber, oil, furs, and grain. Trade was concentrated with the U.S., Great Britain, The Netherlands, China, and Germany. During the period from 1925 through 1937, the Soviet share of world trade amounted to about 1.5 per cent of the total.

Since World War II, the pattern of Soviet trade has changed considerably, although the volume

is still not great. Between 1945 and 1952, 80 per cent of all Soviet trade was carried on within the Soviet bloc. This pattern has not changed significantly since 1953. In 1954, at a time when Soviet gross national product was about one-third that of the U.S., the Soviet share in world trade (in value) was one twenty-fifth that of the U.S. and only 1.5 per cent of the world total.

GOVERNMENT: The U.S.S.R. is an authoritarian state "of workers and peasants," in which Soviets (councils) of "democratically elected" representatives—in theory—hold all local and central authority. The U.S.S.R. is actually controlled by the Communist party of the Soviet Union (see also *Communism*). The party is the only political organization permitted, and its powers extend to every facet of life. The party, in 1957, had about 8,000,000 members. It is led by the Central Committee, which functions through the Presidium, which has 15 full and two candidate members; a six-member Secretariat, with the most important member the first secretary; and a committee of party control. In theory, the highest organ of the party is the All-Union Party Congress, which should meet at least once every three years.

The U.S.S.R. in form is a parliamentary state, but there is little connection between the forms and the political realities. The constitution of Dec. 5, 1936, provides that, in theory, the highest organ of the state is the Supreme Soviet, which consists of two equal houses. One of these is the Soviet of the Union, elected every four years, with one deputy for each 300,000 inhabitants. The other is the Soviet of Nationalities, also elected every four years. In this house, each constitutional

THE SOVIET CAPITAL

Showing the "government lane," in which only officials can travel, this street leads to the Historical Museum on Red Square; to the right is the Spasski Tower of the Kremlin, topped by a star

Edo Koenig, from Black Star



republic has 25 deputies, each autonomous republic 11, each autonomous region 5, and each national area 1. Members are chosen on the basis of universal, equal, and direct suffrage by secret ballot, but no opposition parties are allowed and only very rarely does the voter have a choice between two Communists. Moreover, the Supreme Soviet, though formally the legislature of the Soviet Union, meets only for a day or two twice a year, and it is used only as a façade and a sounding board for party speeches.

The constitution also provides that regular sessions of each body be held twice a year; that there shall be a president of each house; and that there shall be a Presidium of the Supreme Soviet to act as an executive and directive body between the sessions of the Supreme Soviet. In theory, the Supreme Soviet elects the Presidium and the council of ministers, which resembles a cabinet and which is supposed to be responsible to the Supreme Soviet. In fact, however, the Communist party governs, and power flows from the party hierarchy down and does not proceed from the Supreme Soviet.

The supreme court is elected by the Supreme Soviet and supervises the work of the lower courts. Courts in the administrative divisions are in theory elected by the local soviets.

MILITARY STRENGTH: The Soviet government, since its establishment, has placed a high priority upon military security. Every Soviet male (except those who receive higher education), receives

military training, and elementary military training is a part of the curriculum in all schools. About 15 per cent of the budget is devoted to the armed forces, and in some years after World War II the figure was considerably higher. Current military strength is estimated at 4,000,000 men. The air force, which had about 14,000 aircraft in 1948, had about 20,000 in 1957. As for unconventional weapons, the U.S.S.R. developed and produced atomic and hydrogen bombs of all types and sizes and probably makes about the same progress as the U.S. in developing guided missiles and other new weapons.

The Soviet navy increased considerably in size and quality after the beginning of World War II, due to Soviet acquisition of German and Italian naval craft and to a massive building program of its own. In 1957 the number of submarines was estimated at 500, but there was no evidence of Soviet aircraft carriers. The U.S.S.R. was known to have several battleships and many cruisers and destroyers.

HISTORY: The history of Soviet Russia begins on Nov. 7, 1917, when the Communists overthrew the provisional government headed by Alexander Kerensky (*q.v.*). Their opportunity was provided by the failure of the Russian army during World War I (*q.v.*) and by the gradual weakening of the provisional government, which had replaced the czarist regime after the revolution of March 1917. The Communists, led by Lenin and Trotsky (*qq.v.*), gradually extended their power throughout Russia. In the course of a bitter civil war (1917-20), they conquered a variety of unorganized opposition forces, generally called the Whites. At the same time, they ousted from Russian soil interventionist forces from Great Britain, France, Japan, and the U.S. They succeeded because of the divisions within the opposition, the irresolution of the Allied forces, the extraordinary leadership of Lenin, and the policies they adopted. They concluded, to popular applause, a separate peace treaty with Germany, at Brest-Litovsk in March 1918, which took Russia out of the war at a heavy loss in territory. Immediately upon seizing power, they decreed the partitioning of the large estates and the distribution of the land to the peasants. They established firm control over industry, particularly through nationalization. Breaking up the recently elected constituent assembly, the Communists set up an authoritarian regime and set out to establish a Socialist society.

By 1921, the Communists were in full control in Russia, but the country had been devastated by war, civil war, and Communist economic policy. Important western territories of the Russian empire had been lost, as Finland, Estonia, Latvia, Lithuania, and Poland gained independence. Faced with peasant dissatisfaction and up-

PETROGRAD GARRISON, 1917

Rebellious units demonstrate in May

Courtesy Sovfoto



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risings and even with discontent within the party, Lenin in 1921 sponsored the New Economic Policy (NEP), which was a retreat from his earlier policies. While retaining control of the key industries, the regime abandoned requisitioning food from the peasants and instituted a fixed tax in kind, allowing the peasant to keep or sell the remainder of his product. This basic change was followed by partial freedom of retail trade, the return of small industrial and commercial establishments to their owners, increased efforts to expand foreign trade, and general relaxation of controls throughout Soviet life. At the same time, Soviet foreign policy was revised, and the 1917-21 period of promoting international revolution was replaced by an era of defensive isolation. During this period, the U.S.S.R. signed trade and nonaggression treaties, particularly with Germany in 1922, and gradually assumed some respectability in the international community.

Lenin had persuaded the party to adopt the NEP only by using his immense prestige and by pointing out that the Communists had no alternative. This retreat was considered, however, only a temporary step backward in order to take two steps forward later, and Lenin himself would surely have pressed on to Socialism if he had survived. Lenin, who died on Jan. 21, 1924, was succeeded as party leader by the triumvirate of Stalin, Zinoviev, and Kamenev. Stalin, however, who had been made general secretary of the party in 1921, gradually and quietly obtained power and finally triumphed over his rivals. In 1927 Leon Trotsky (*q.v.*), his principal opponent, was ousted from the party and, later, exiled. In 1929, on his 50th birthday, Stalin was acclaimed "Vozhd" or leader, and he remained the Soviet dictator until his death in March 1953.

In 1927 Soviet industrial and agricultural production reached prewar levels, and the economy as a whole had recovered from the civil war. As recovery came into sight, Soviet planners and party leaders disputed vigorously over economic and political policy. The Communists were especially worried over the revival of capitalism under the NEP, by the fact that the economy was less and less under party and state control, and by the reluctance of the peasants to market their surplus products. In the mid-1920's the government lacked the traditional grain surplus for feeding the urban centers and for export. Rationing was reintroduced in some cities in 1926, and Soviet ability to pay for imports declined sharply. In order to reverse these developments, the party in 1928 launched a new Socialist offensive, in the form of the first Five-Year Plan. The principal aims of the plan were: (1) to make the Soviet Union a modern industrial state; (2) to create the economic and political foundations for a So-



Courtesy Sovfoto

COLLECTIVIZED FARM IN THE R.S.F.S.R.

Collectivization was attempted early in the grain-producing area of the Salsk Steppes

cialist society and to destroy the basis of capitalism; and (3) to confirm party and state control over Soviet life. The first Five-Year Plan ended in 1932; the Soviet Union in 1956-60 was in its sixth plan. See also *ECONOMY* (*above*).

The new drive, especially the part on collectivization of agriculture, which was carried out with speed and ruthlessness, aroused both great enthusiasm and intense opposition within and beyond the U.S.S.R. The Socialist ideal stimulated many Communists and other Russians to immense effort over a long period of years, and the programs offered great opportunities for education and advancement to millions of Russians. At the same time, those who were dispossessed and those who were shocked at the waste and inefficiency often opposed the program. The drive for industrialization and collectivization—as a result of which 5,000,000 people died—tightened pressures generally throughout the U.S.S.R.; and the 1920's were marred by famine, violent coercion, the establishment of forced labor camps, and bitter, long hardship for the population. The living standard sank sharply after 1928, and the 1927 level was not reached again until 1936 and 1937.

The first Five-Year Plan was launched almost simultaneously with the outbreak of the world depression, and the vigorous pressure for increased production appealed to many outside of the U.S.S.R. during a stagnant period in European and American history. At the same time, many were repelled by the drastic measures used and by the disregard shown for human life and for elementary freedoms. Consequently, in the

1930's the non-Communist world had a larger number than before both of Communist sympathizers and of anti-Communists. The latter group increased in the late 1930's because of a series of Communist purges and public trials, as a result of which about 1,000,000 were expelled from the party. The most spectacular trials, however, occurred in 1937 and 1938, when about 50 high-ranking Communist leaders of long standing confessed to sabotage and treason in public trials. The list of those who confessed and were subsequently executed included many Old Bolsheviks: N. I. Bukharin, the principal theorist after Lenin; Marshal M. N. Tukhachevski, of the Red Army; and G. G. Yagoda, head of the secret police, the NKVD. Five of the seven members of the 1924 Politburo were shot in these years, and 49 of 72 members of the 1934 Central Committee were also purged. A speech by N. S. Khrushchev (*q.v.*) to the 20th party congress in 1956 threw responsibility for these extraordinary "confessions" and executions upon Stalin, who apparently wanted to eliminate all of the Old Bolsheviks.

After its failure to establish Communist states in Europe at the end of World War I, the Soviet government and its principal revolutionary instrument—the Third or Communist International (Comintern)—concentrated upon the Far East, particularly China (*q.v.*). And in the 1930's the U.S.S.R. gradually abandoned its economic and political interests in Manchuria to Japan.

The rise to power of Adolf Hitler in Germany (*qq.v.*) forced a revision of Soviet foreign policy toward Europe in the 1930's. The Kremlin slowly reversed its policy toward the other nations of Europe and the League of Nations—in January 1934 it concluded nonaggression pacts with Poland and the Baltic states; in June it ended its border disagreement with Rumania and concluded a pact with Czechoslovakia; in September it joined the League of Nations, which it had previously denounced; in December it signed mutual-defense treaties with France and Czechoslovakia. Moreover, in the League of Nations, the Soviet foreign minister, Maxim M. Litvinov (*q.v.*), strongly supported all efforts toward disarmament. At the same time, the Comintern "urged" the various European Communist parties to abandon opposition to military appropriations, to support bourgeois governments, and to cooperate with both bourgeois and Socialist parties in so-called popular front (*q.v.*) governments. The constitution of 1936 fit into this pattern, and on paper the U.S.S.R. became a constitutional and democratic state (see also GOVERNMENT, *above*).

The Soviet effort to cooperate with the European democracies against Hitler and his allies, Mussolini and Franco, broke down, however. France and Great Britain gave tardy and ineffec-

tive support to the Spanish Republic during the Spanish Civil War and resented the little assistance the Soviet Union provided. Mutual suspicion clouded all relationships in the crises over Ethiopia, the remilitarization of the Rhineland, the German annexation of Austria, and the dismemberment of Czechoslovakia at the Munich Conference (see also *Appeasement Policy*).

When the conclusion of the Munich Pact (*q.v.*) made the Soviet alliance with France of doubtful value, the Kremlin began to question the willingness and ability of the Western democracies to resist Hitler. Litvinov was suddenly replaced as foreign minister by Vyacheslav M. Molotov (*q.v.*) in May 1939. While the Kremlin dragged on negotiations for an alliance with France and Great Britain on Soviet terms, suddenly, on Aug. 21, the U.S.S.R. concluded a new trade pact with Nazi Germany and, two days later, a nonaggression pact, thus giving Hitler the green light to invade Poland (Sept. 1, 1939) and thus start World War II. Soviet forces invaded Poland on Sept. 17, and on Sept. 29 Germany and the U.S.S.R. partitioned Poland. The U.S.S.R. acquired 77,606 sq. m. of Polish territory and about 13,000,000 people. At about the same time, the Soviet Union concluded assistance pacts with the Baltic states, obtaining the right to establish military bases there. These states were incorporated into the Soviet Union in June 1940, and Bessarabia and Bukovina were annexed from Rumania in July. In November 1939, when Finland refused Soviet demands to yield strategic territory, the Red Army attacked. After a long and bitter winter war, peace was concluded in March 1940, with the Soviet Union obtaining the territories it had demanded.

In April 1941 the U.S.S.R. signed a neutrality pact with Japan, which ended Japanese pressure against the Soviet Far Eastern frontiers and, in effect, encouraged the Japanese to increase their efforts to expand in China and in the Southwest Pacific.

The Soviet Union scrupulously fulfilled the 1939 trade agreement with Germany, and the Soviet government and the Communist parties around the world denounced Britain and France for their "imperialistic" war against Germany. Russo-German conflict soon arose, however, after a visit by Molotov to Berlin in November 1940. It became clear that German ambitions in the Balkans, particularly in Rumania and Bulgaria, conflicted with Soviet interests and that the German forces then stationed in Finland were considered a threat to the U.S.S.R. Molotov, who had also held the premiership, was replaced in this post by Stalin in May 1941, and the Soviet leaders made it clear that they were willing to yield to any reasonable German offers or demands. Hitler, however, with Italian, Rumanian, and Hungarian

support, launched an attack upon the U.S.S.R. in June 22, 1941. Finland joined this campaign within a few days, and the Soviet forces reeled back. The British, who had several times warned the Kremlin that an attack could be expected, immediately accepted the U.S.S.R. as an ally and signed a mutual-aid pact in July 1941. The U.S. almost as quickly granted aid under Lend-Lease (*q.v.*). See also *World War II: Nazi Drive to the East*.

The original attack apparently had no fixed goal, and the German military leaders believed they could destroy Soviet armed resistance in six weeks. The campaign made enormous progress, but, in the crucial battle for Moscow, the Germans were stopped within sight of their goal by determined and skillful Russian resistance, led by Marshal Georgi K. Zhukov (*q.v.*).

After being driven back during the following months, the German forces launched another major drive in the summer of 1942. Already in possession of about 40 per cent of Russia's industrial resources, the Germans began an offensive along a 480-m. front stretching from the Caucasian oil fields to the Volga city of Stalingrad (*q.v.*), but the invaders again failed to break Soviet resistance (see also *World War II: Stalingrad*). In addition to determined Russian resistance, Hitler, who had originally been greeted as a liberator by many Russians, now had to face guerrilla warfare from a civilian population that endured savage mistreatment and exploitation at the hands of the occupying forces.

Stalingrad was the turning point of the war in the east. The Nazis launched another major attack toward Orel and Kharkov in July 1943, but the tide had turned, in January 1943, toward the Russians, who were now driving the Germans from Russian soil and through Eastern Europe back into Germany (see *World War II: The Russian Counteroffensive*). By January 1945, 3,000,000 Russian soldiers were on the German frontier, ready for the final assault upon the Nazi armies and Berlin, which was captured on May 2, 1945. Russian and American forces met on the Elbe River near Torgau, and the German surrender document was ratified on May 8-9.

Russian losses during the war were enormous. It is estimated that 5,000,000 of the armed forces and 7,000,000 civilians were killed. Property damage and other losses have been estimated at from \$128,000,000,000 to \$190,000,000,000.

The Soviet regime emerged from the war as the head of the second most powerful state in the world. The war had tightened the bonds among the various Soviet peoples and increased the Communist system's prestige within and beyond the country. At the same time, it had enabled Soviet forces to obtain control of all of Eastern Europe, and the Kremlin soon transformed these countries into Soviet satellites.



Courtesy Sovfoto

MEETING IN MOSCOW DURING WORLD WAR II

From left to right are Sir Alexander Cadogan of Great Britain, V. N. Pavlov, British Prime Minister Winston Churchill, U.S. Ambassador W. Averell Harriman, Marshal Joseph Stalin, and Vyacheslav M. Molotov

During the war, Prime Minister Winston Churchill, President Franklin D. Roosevelt (*q.v.*), and the Allied peoples watched the Soviet sufferings with great sympathy. In conferences (Teheran, 1943, and Yalta, 1945) and correspondence, the efforts of President Roosevelt, in particular, were directed toward creating a strong and united effort against the Germans, in order to end the war quickly and to carry the pattern of cooperation over into the postwar era, thus insuring peace.

Already during the war, however, the main postwar problems had begun to emerge. In particular, Poland (*q.v.*) became an issue between East and West. The Sovietization forced upon Poland and the Communist coup in Czechoslovakia (*q.v.*) in 1948 were among the principal causes for the cold war. Other causes for the collapse of the wartime alliance were Soviet reluctance to honor its 1941 agreement to evacuate Iran six months after the war, territorial demands upon Turkey in 1945 and 1946, and the Moscow-instigated civil war in Greece (*q.v.*). These overt acts led to the Truman Doctrine in March 1947 (see *Truman, Harry S.*). The Anglo-American efforts to obtain agreement over the control and development of Germany also broke down after the war, and through Soviet intransigence Germany remained divided, with the Eastern zone becoming a typical Communist state (see also *Berlin Blockade; Germany*).

At home, reconstruction at a very rapid pace was begun as occupied territories were freed, and the fourth Five-Year Plan in March 1946 again emphasized heavy industries. Many party members were purged after the war, political controls were tightened, and in 1946 a new campaign was

launched against Westernism and bourgeois influences in every field of Soviet life. In 1947 the Kremlin and the satellites boycotted the European Recovery Program (*q.v.*), and the Communist Information Bureau (Cominform) was established in the same year. By that time, the U.S.S.R. had clearly entered an era of aggressive expansionism, similar to that of 1917-21. This stage reached its peak in June 1950, with the North Korean invasion of South Korea at a time when the Soviets had absented themselves from the U.N. Security Council, thus enabling the U.N. to take collective action against this act of aggression. In order to offset N.A.T.O. strength, the Kremlin created (1954) a unified military command of all Communist forces in Europe, under the direction of a high Soviet officer.

Shortly after the death of Stalin on March 5, 1953, the new rulers, under Premier Georgiy M. Malenkov (*q.v.*), apparently tried to reduce or eliminate the political liabilities they had inherited from the dictator. They created what they called collective leadership. They relaxed slightly the severely repressive system, gradually reduced considerably the prison-camp population, provided somewhat increased access to foreign culture, promised more consumer goods, and occasionally promised increased civil rights to Soviet citizens. In February 1955 Premier Malenkov was suddenly superseded by Marshal Nikolai Bulganin (*q.v.*), and First Party Secretary Khrushchev broadened his influence. After Stalin's death, the satellite states in Eastern Europe, too, were allowed more freedom to achieve Socialism in their own way, but this slight political relaxation ended abruptly when Poland and Hungary rebelled against Kremlin suzerainty in October and November 1956. Poland was able to complete negotiations for the deployment of Soviet forces within Poland and to obtain sufficient freedom to break up almost all the collective farms and to allow considerable intellectual ferment and travel abroad. The Hungarian rebellion, however, became a popular uprising against Communist rule itself, and it was crushed by brutal Soviet armed intervention; about 25,000 Hungarians were killed and dictatorial Communist rule was restored.

Beyond the boundaries of the Soviet empire, the main policy change involved a more conciliatory approach to Marshal Tito of Yugoslavia (*q.v.*), ousted from the system by Stalin in 1948. This switch, marked by an extraordinary apology in 1955 in Belgrade by Khrushchev, was only temporary, however; and in the spring of 1958 Yugoslavia was again denounced and isolated economically.

Meanwhile, the Kremlin had agreed to an end of the Korean war (1953) and accepted an Austrian State (peace) Treaty to which the West-

ern powers agreed (1955). Unlike Stalin, Soviet leaders ventured outside the U.S.S.R. (*e.g.*, by attending a Big Four Conference in Geneva, 1955), in order to emphasize the principle of peaceful coexistence and the expansion of trade and cultural contacts with non-Communist countries. These steps, plus opening diplomatic relations with West Germany and indicating receptivity to Western disarmament proposals, seemed good omens, but expansion of Communist influence in the Middle East led many Western observers to believe that Soviet goals of world domination remained unchanged.

What was probably the Kremlin's most astonishing and serious turn-around came in February 1956, at the 20th party congress, when Khrushchev, in a "secret" speech, blamed Stalin for many military and economic failures and for the slaughter of many party members. This speech caused shock and confusion among millions of Communists throughout the world. The announcement and the previous statement that there are several roads to Socialism probably played a significant part in the anti-Kremlin events in Poland and Hungary. Albania, Bulgaria, Czechoslovakia, and Rumania were unaffected by these events and remained fully in the Soviet camp; and China seemed to avoid conflicts with the Soviet rulers.

During the period after 1955, Khrushchev gradually emerged as the principal Soviet ruler. In July 1957, three strong collaborators of Stalin and one high aide of Khrushchev—Malenkov, Molotov, Lazar M. Kaganovich, and Dmitri T. Shepilov—were removed from high government and party positions, and later in the same year, Marshal Georgi K. Zhukov (*q.v.*), was dismissed from his high posts. These changes were accompanied by important domestic policy shifts, in particular, the decentralization of industrial management, the sale of all agricultural equipment by the machine tractor stations to the collective farms, increased production of consumer goods, and an expanded program of cultural exchange with Western nations. At the same time, the Soviet Union launched an impressive program of loans to underdeveloped countries, giving credits of *ca.* \$2,000,000,000 between 1955 and 1958.

The Russians startled the world in 1957 when they launched the first earth satellite, but this initial achievement was soon eclipsed by a surge forward in space exploration by both the Soviets and the U.S. After launching experimental capsules bearing mice, monkeys, dogs, etc., the Russians sent Maj. Yuri A. Gagarin (April 12, 1961) and Maj. Gherman S. Titov (Aug. 6-7) into orbits around the earth. See also *Astronautics*.

Indications of tension between Russia and China appeared early in 1961 over economic and

UNIONTOWN

doctrinal questions. After Russia's refusal to endorse the Chinese attack on India's Himalayan border late in 1962, mutual recriminations began to be made publicly by both China and Russia.

The Soviets in 1962 began installing missile bases in Cuba, but when the U.S. placed a naval quarantine around the island and demanded removal of all missiles as well as jet fighters which Russia had sent to Cuba, the Russians removed both missiles and planes. This brought angry protests from Communist China, which accused the Russians of surrendering to the imperialists, meaning the U.S.

Uniontown (ūn'yūn-toun), county seat of Fayette County, Pennsylvania, 50 m. s.e. of Pittsburgh. It is on the Pennsylvania and the Baltimore & Ohio R.R.'s and is surrounded by agricultural territory. There are large and valuable deposits of gas and coal in the vicinity. Among the manufactures are flour, clothing, iron and steel wares, coke, bread, and machinery. The place was settled in 1769 and incorporated in 1796. Population, 1950, 20,471.

Unit (ū'nīt), in arithmetic, the name applied to a single thing as *one* or *unity*; the smallest whole number, represented by the figure 1. In a broader sense, a unit is a quantity taken as a standard on which measurements may be based. For example, in the expression *10 centimeters*, the term centimeter is the unit of length and the number 10 represents the number of units making up the distance being described. Units are frequently relative in character: for example, *one foot* is a unit in regard to feet, but it is only $3\frac{3}{4}$ per cent of a unit in regard to yards.

Units are classified into *arbitrary* or *fundamental* units and *derived* units, and are consistently organized into convenient systems. *Fundamental units* are used to describe *mass*, *length*, and *time*. *Mass* may be simply described as quantity of matter. The unit of mass, in terms of which the quantity of matter in any unknown mass may be expressed, is purely arbitrary and is based on some convenient natural unit. In the metric system, the unit of mass, called the gram, is defined as the one-thousandth part of the mass of a particular cylinder of platinum-iridium alloy which is carefully preserved at the International Bureau of Weights and Measures at Sèvres, France. It is very nearly equal to the mass of one cubic centimeter of water at the temperature of maximum density (4°C). In the English system, the unit of mass is the pound, which is now defined as 453.5924 grams.

The unit of *length* in the metric system is the meter, which was originally defined as one ten-millionth of the earth's quadrant; but today it is considered to be merely the distance between two marks on a particular platinum bar kept in Sèvres. A more recently developed standard,



Courtesy United Press Photo

NIKITA S. KHRUSHCHEV IN CALIFORNIA

During his tour of the U.S. in September 1959, the Soviet premier made an unexpected visit to a supermarket. After his conferences with President Eisenhower, Khrushchev insisted he would not use "duress or compulsion" in trying to change the political situation in West Berlin nor force the Western powers to withdraw their military units.

which has the great advantage of practically universal accessibility, is the use of a particular wave length of light as the standard of length.

Time is universally measured in seconds. The second is $1/86,400$ th of a mean solar day.

A unit of area may be considered as a typical example of a derived unit. Thus the unit *square foot* in the English system is derived from the unit foot, instead of being defined independently. Other derived units are: (1) *velocity*, which is defined as the ratio of the distance traversed by a body divided by the time elapsed, i.e., $\frac{l}{t}$,

where l is length and t is time; (2) *acceleration*, or velocity divided by time, i.e., $\frac{v}{t}$ or $\frac{l}{t^2}$; and (3) *force*, or mass-multiplied-by-acceleration. (4) *Work* is defined as the product of force by the distance through which it operates.

There are a number of different systems of units. Based on British units, one system uses the foot, the second, and the pound (as a unit of mass). In this system the unit of force is the poundal, which is the force required to give a mass of 1 lb. an acceleration of 1 ft. per second per second. A second (gravitational) system uses the foot, the second, and the pound weight as a unit of force. In this system the unit of mass is the slug, which is a mass such that a force of 1 lb. weight gives 1 slug an acceleration of 1 ft. per second per second. One slug = 32.174 lb. (mass). One lb. (force) = 32.174 poundals.

In the metric system the centimeter-gram-second (cgs) system is used in much scientific work, and the meter-kilogram-second-ampere (mksa) system is used in electrical engineering and electrophysics. Their relations are indicated in Table 1.

In thermodynamics two quantities must be measured: (1) *temperature* and (2) *quantity of heat*. There are three arbitrary scales for temperature measurements. The Fahrenheit (F.)

TABLE I

| Quantity | cgs Unit | mksa Unit | No. of cgs Units in 1 mksa Unit |
|---------------|-----------------------|---------------------|------------------------------------|
| mass | gram | kilogram | 1,000 |
| length | centimeter | meter | 100 |
| time | second | second | 1 |
| velocity | cm/sec | m/sec | 100 |
| acceleration | cm/sec ² | m/sec ² | 100 |
| force | dyne | newton | 100,000 |
| work (energy) | erg | joule ¹ | 10,000,000 |
| power | erg/sec | watt ² | 10,000,000 |
| current | abampere ³ | ampere ³ | 0.1 |
| voltage | abvolt ⁴ | volt ⁴ | 100,000,000 |
| resistance | abohm ⁵ | ohm ⁵ | 1,000,000,000 |

¹ A joule is the work done by a force of 1 newton acting through a distance of 1 meter.

² A watt is the power corresponding to a transformation of energy at the rate of 1 joule per second.

³ An ampere is the constant current which, if maintained in two straight parallel conductors of infinite length, of negligible circular sections, and placed 1 meter apart in a vacuum, will produce between these conductors a force equal to 2/10,000,000 of a newton of force per meter of length.

⁴ A volt is the electromotive force which, in maintaining a current of 1 ampere, does work at the rate of 1 watt.

⁵ An ohm is the electrical resistance of a circuit such that 1 volt just suffices to maintain a current of 1 ampere in the circuit.

⁶ The prefix "ab-" denotes units of the cgs absolute electromagnetic system. The prefix "stat-" is similarly used to denote units of the cgs electrostatic system.

degree is $\frac{1}{180}$ th of the interval between the temperature of water boiling under normal barometric pressure and the temperature of melting ice. The centigrade (C.) degree is $\frac{1}{100}$ th, and the Réaumur degree is $\frac{1}{80}$ th of the above-mentioned difference. The quantity of heat is the amount of heat necessary to heat a unit mass of any substance through unit temperature interval. In the metric system this is called *calorie*, which is the quantity of heat required to raise one gram of water through one degree C.; in the British system it is the heat required to raise 1 lb. of water one degree F. and is called the British thermal unit (Btu). In scientific work it is preferable to express quantities of heat in joules rather than in calories. In nutrition it is common practice to use the "Calorie," also called the "large calorie" or the "kilocalorie." One "Calorie" equals 1,000 "calories."

TABLE 2

| Prefix | Multiplying Factor |
|--------|--------------------|
| mega- | 1,000,000. |
| kilo- | 1,000. |
| hecto- | 100. |
| deka- | 10. |
| deci- | 0.1 |
| centi- | 0.01 |
| milli- | 0.001 |
| micro- | 0.000,001 |

To cover the wide range met with in physical measurements, it is often convenient to form the names of new units which are simple decimal multiples or submultiples of other units by the use of appropriate prefixes. Thus, 1 kilowatt =

1,000 watts, 1 microhm = one-millionth of an ohm. Prefixes commonly used are listed in Table 2. See also *Electrical Units*.

Unitarianism (*ū-nī-tā-rī-an-iz'm*), a religious movement without a creed. It is nontrinitarian and calls for complete mental freedom and the unrestricted use of reason as opposed to authority, as well as generous tolerance of the religious views of others. The term *Unitarian* was used as early as Oct. 25, 1600, in a decree of the Transylvania diet, and was adopted by the Transylvanian Unitarians as the designation for their church in 1638. This branch is now known as the Hungarian Unitarian Church. Allied sects are well represented in many countries of Europe, especially in Great Britain, Czechoslovakia, and Poland.

Unitarianism in America had its origins in Plymouth, Mass., with the founding of the first church there in 1620, but as a distinct organization it dates from the early part of the 19th century, when the preaching of William E. Channing and others brought its principles into prominent notice. In 1956 the church had a membership of ca. 100,000, 366 churches, and 100 fellowships in the U.S. The chief periodical is the *Unitarian Register*.

United Arab Republic (*ū-nī-tēd*), THE, a political and administrative union of Egypt and Syria (*q.v.*), in force between February 1958 and September 1961. Gamal Abdel Nasser of Egypt was president of the U.A.R. and Cairo its capital. The U.A.R. and Yemen (*q.v.*) formed a loose union (called the United Arab States) in March 1958, which was also abolished in 1961. The designation of United Arab Republic was retained by Egypt as the name of the country.

United Brethren in Christ. See *Evangelical United Brethren Church*.

United Kingdom. See *England; Great Britain*.

United Mine Workers of America, an industrial labor union, organized in 1890, which was launched to solidify the American coal miners into a national union. Originally a member of the American Federation of Labor (*q.v.*), the U.M.W.A. separated from the A. F. of L. in November 1935 and joined the newly formed C.I.O. (the present Congress of Industrial Organizations, *q.v.*), but in October 1942 this relationship was severed. The U.M.W.A. reaffiliated with the A. F. of L. on Jan. 17, 1946, but disaffiliated again in 1947. Membership totals ca. 600,000. The U.M.W.A. is composed of an international union with jurisdiction over Canadian miners as well as those of the U.S. Its far-flung jurisdiction has effected numerous innovations in the miners' working conditions during the 20th century; its vast revenue has supported strikes and organized new unions. Its policies, however, have stemmed largely from its leader, John L. Lewis (*q.v.*), union president since 1920.

Lewis has been extremely successful in testing the union's independence, and in securing concessions such as paid vacations and pensions based on a tonnage royalty paid by the coal operators.

In the late 1940's and early 1950's the U.M.W.A. aroused nationwide attention in connection with strikes called by the leadership. When the union failed to comply with injunctions asked for and received by the government from Federal courts, legal questions arose which are of broad interest. In a 1946 case, the Supreme Court upheld the lower court decision that the Norris-La Guardia Act (*q.v.*) did not, as the union maintained, prohibit courts from issuing injunctions in cases where the government is the employer (the mines at that time were under government control). Charged with violating the Taft-Hartley Law by calling a strike (March 1948) over the interpretation of pension-plan provisions, the union was called upon by court order to send the strikers back to work "forthwith." Since Lewis did not take effective measures to return the miners to the pits before April 12, he and his union were held in contempt of court and were fined \$1,420,000, but only after a controversy over pensions was settled did the miners return to work.

United Nations, frequently abbreviated as U.N., a term which was suggested by President Franklin D. Roosevelt, first used in the "Declaration by United Nations" of Jan. 1, 1942, and formally accepted at the San Francisco Conference (1945) as the name of the new international organization. The U.N. formally came into being on Oct. 24, 1945, when the Charter of the organization, drawn up and signed at the San Francisco Conference, was ratified by China, France, Great Britain, the U.S., and the U.S.S.R. and a majority of the remaining signatory nations.

The origins of the U.N. go back beyond the San Francisco Conference. On Jan. 1, 1942, 26 countries signed the "Declaration by United Nations," in which they subscribed to the purposes and principles contained in the Atlantic Charter (*q.v.*) and pledged themselves to cooperate toward winning the war and to refrain from making a separate peace. The declaration was subsequently signed by 21 other states.

The first mention of a future world organization to keep the peace came, over a year later, at the Moscow Conference in October 1943 when Great Britain, the U.S., the U.S.S.R., and China issued a declaration in which they recognized the necessity of establishing as soon as possible a general international organization for the maintenance of peace and security.

The plans for such an organization were drawn up at Dumbarton Oaks (*q.v.*) by representatives of the same four powers in 1944. These proposals were based on the concept that any organization set up to preserve the peace must have force at

its command. Nations maintaining forces must, therefore, accept responsibility and leadership. In matters other than the maintenance and enforcement of peace, all nations, large and small, should have an equal voice.

At the Crimea Conference (*q.v.*) it was decided to call a conference of the United Nations to draft a charter based on the Dumbarton Oaks proposals. A formula for voting in the Security Council was also agreed upon.

The San Francisco Conference convened on April 25, 1945, and was attended by the nations then at war with Germany or Japan which had adhered to the declaration of Jan. 1, 1942. At that conference, the Charter of the U.N. was written.

The main purposes of the U.N. are: (1) to maintain international peace and security; (2) to develop friendly relations among nations, based on respect for the principle of equal rights and self-determination of peoples; (3) to achieve international cooperation in solving international problems of an economic, social, cultural, or humanitarian character; and (4) to be a center for harmonizing the actions of nations in the attainment of these common ends.

MEMBERSHIP. The original members of the U.N. are those states which had participated in the San Francisco Conference, or had signed the 1942 declaration, and which signed and ratified the Charter. The 51 original members are:

| | | |
|----------------|--------------------|-----------------------------|
| Argentina | Egypt ¹ | Norway |
| Australia | El Salvador | Panama |
| Belgium | Ethiopia | Paraguay |
| Bolivia | France | Peru |
| Brazil | Greece | Philippines |
| Byelorussian | Guatemala | Poland ² |
| S.S.R. | Haiti | Saudi Arabia |
| Canada | Honduras | Syria ¹ |
| Chile | India | Turkey |
| China | Iran | Ukrainian S.S.R. |
| Colombia | Iraq | Union of South |
| Costa Rica | Lebanon | Africa |
| Cuba | Liberia | U.S.S.R. |
| Czechoslovakia | Luxemburg | United Kingdom ³ |
| Denmark | Mexico | United States |
| Dominican | The Netherlands | Uruguay |
| Republic | New Zealand | Venezuela |
| Ecuador | Nicaragua | Yugoslavia |

New members are admitted by a two-thirds vote of the General Assembly upon recommendation of the Security Council. The following additional members had been admitted by the end of 1961, bringing the total to 104: Afghanistan, Iceland, Sweden, and Thailand, 1946; Pakistan and Yemen, 1947; Burma, 1948; Israel, 1949; Indonesia, 1950; Albania, Austria, Bulgaria, Cambodia, Ceylon, Finland, Hungary, Iceland, Ireland, Italy, Jordan, Laos, Libya, Nepal, Portugal,

¹ Egypt and Syria formed a single state—United Arab Republic—in 1958, but this was dissolved in 1961. ² Although Poland was not represented at San Francisco, it was agreed that she should sign the Charter as an original member. ³ Usually called Great Britain.



Courtesy United Press Photos

SAN FRANCISCO, 1955

Secretary General Dag H. Hammarskjöld, who was killed in an airplane crash in 1961 while on a peace mission to the Congo (Léopoldville), is seen here watching the 9th General Assembly President Elco N. van Kleffens (right) introducing former U.S. President Harry S. Truman at the conference marking the tenth year of the U.N.

Rumania, Spain, 1955; Japan, Morocco, Sudan, Tunisia, 1956; Ghana, Federation of Malaya, 1957; Guinea, 1958; Cameroun, Central African Republic, Chad, Congo (Brazzaville), Congo (Léopoldville), Cyprus, Dahomey, Gabon, Ivory Coast, Malagasy Republic, Mali, Niger, Nigeria, Senegal, Somalia, Togo, and Upper Volta, 1960; Mauritania, Mongolia, Sierra Leone, and Tanganyika, 1961; Algeria, Burundi, Jamaica, Rwanda, Trinidad and Tobago, and Uganda, 1962.

PRINCIPAL ORGANS. The charter provides specifically for the establishment of six principal organs—a General Assembly, a Security Council, an Economic and Social Council, a Trusteeship Council, an International Court of Justice (*q.v.*), and a Secretariat. Subsidiary organs may be established if necessary.

The first meeting of the General Assembly took place on Jan. 10, 1946, that of the Security

Council on Jan. 17, and that of the Economic and Social Council on Jan. 23—all in London. The International Court of Justice held its first meeting at The Hague on April 3. The Secretary General of the U.N. was appointed on Feb. 1. The Trusteeship Council held its first meeting at Lake Success, Long Island, N.Y., on March 26, 1947.

GENERAL ASSEMBLY. The General Assembly consists of all the members of the U.N. No member may have more than five representatives in the Assembly. Each member has one vote.

A two-thirds majority of the members present and voting is required for decisions on important questions; decisions on other questions, including what additional categories of questions should require a two-thirds majority, are made by a simple majority of the members present and voting.

The General Assembly meets in regular annual sessions beginning, as a rule, the third Tuesday in September, and in such special sessions as are required. It adopts its own rules of procedure and elects its president for each session.

The Assembly considers and approves the budget of the organization. The expenses of the organization are borne by the members according to a scale decided upon by the General Assembly.

The General Assembly may discuss any questions or any matters within the scope of the Charter or relating to the powers and functions of any of the organs of the U.N. and, with one exception, may make recommendations to members, or to the Security Council, or both, concerning such questions. The one exception is that the General Assembly may not make recommendations on any question affecting peace and security which is currently being handled by the Security Council, unless the Council asks it to do so. At its fifth session, in 1950, however, the Assembly decided that if the Security Council, because of a veto by any of its five permanent members, fails to take action to maintain peace and security when peace has been threatened or there has been an act of aggression, the Assembly itself will consider the question immediately, with a view to recommending collective action to members. This collective action may include the use of armed force when necessary.

With respect to international peace and security, the



COMMITTEE ACTION

The Political and Security Committee of the General Assembly makes recommendations to the parent body. The committee is shown here voting on a resolution urging early agreement on the suspension of nuclear tests, one of the major topics before the U.N. in 1959 (*United Nations Photo*)

Charter gives the General Assembly certain specific functions. It may consider the general principles of cooperation in the maintenance of peace and security, including the principles governing disarmament and the regulation of armaments, and make recommendations on them to members or to the Security Council, or to both. It may also discuss questions relating to peace and security brought before it by the Security Council, by a member of the U.N., or by a nonmember state (provided that state accepts in advance the obligations contained in the Charter concerning the peaceful settlement of disputes), and with the exception noted above may make recommendations on these questions to the Security Council or to the states concerned. However, if action is necessary, the matter is to be referred to the Security Council, either before or after discussion. The Assembly may also call the attention of the Security Council to particular situations which are likely to endanger international peace and security.

The Assembly has certain other specific functions. It initiates studies and makes recommendations for promoting international cooperation in the economic and social fields, and the observance of human rights and fundamental freedoms; the Economic and Social Council functions under its authority. It is responsible for the operation of the International Trusteeship System in regard to all territories not classed as "strategic areas" (such territories come under the authority of the Security Council) and is assisted in this by the Trusteeship Council. It considers summaries and analyses prepared by the Secretariat of the information transmitted yearly by member countries administering non-self-governing territories not placed under the Trusteeship System. The General Assembly also initiates studies and makes recommendations to promote international cooperation in the political field and to encourage the progressive development of international law and its codification. It elects the elective members of the Security and Trusteeship councils and all the members of the Economic and Social Council, and together with the Security Council, elects the judges of the International Court of Justice. It receives reports from the other organs of the U.N. On the Security Council's recommendation, it appoints the Secretary General. The staff of the U.N. is appointed by the Secretary General under conditions laid down by the Assembly.

SECURITY COUNCIL. The organ of the U.N. charged with the primary responsibility for the maintenance of international peace and security is the Security Council, composed of 11 members.

The permanent members of the Council are China, France, Great Britain, the U.S., and the U.S.S.R. The six nonpermanent members of the Council are elected by the General Assembly for a term of two years and are not eligible for immediate re-election.

Each member of the Council has one representative and one vote. The Charter states that decisions on procedural matters are to be made by an affirmative vote of any seven members of the Council; decisions on all other matters are to be made by an affirmative vote of seven members including the five permanent members.

The Security Council is so organized as to be able to function continuously and adopts its own rules of procedure, including the method of selecting its president. In practice, however, presidency of the Council is held monthly in turn by the member states in the English alphabetical order. It submits annual and,

when necessary, special reports to the General Assembly. Any member of the U.N. which is not a member of the Council may participate in discussion, without vote, if the Council considers that the interests of that member are specially affected. In the case of a non-member state the Security Council lays down the conditions for its participation.

The Charter states that the parties to a dispute, the continuance of which is likely to endanger the maintenance of international peace and security, shall first of all seek a solution by negotiation, inquiry, mediation, conciliation, arbitration, judicial settlement, resort to regional agencies or arrangements, or other peaceful means of their own choice. It is provided that legal disputes, as a rule, should be referred to the International Court of Justice. The Council determines the existence of any threat to the peace, breach of the peace, or act of aggression and decides what measures, not involving the use of armed forces, are to be taken by members to maintain or restore international peace and security. Should these measures prove inadequate, it may take action by air, sea, or land forces to maintain or restore international peace and security. All members of the U.N. undertake to make available to the Security Council, on its call and in accordance with special agreements, armed forces, assistance and facilities, including rights of passage, necessary for the maintenance of international peace and security. No agreement to date, however, concerning the numbers and types of forces, their degree of readiness and general location, and the nature of the facilities and assistance to be given to the Security Council, has been negotiated.

A Military Staff Committee has been set up to assist and advise the Security Council on questions relating to its military requirements and the employment and command of the armed forces placed at its disposal. The Military Staff Committee is composed of the chiefs of staff of the permanent members of the Security Council or their representatives.

U.N. HEADQUARTERS, NEW YORK CITY

In its widely admired headquarters buildings on the East River, the U.N. conducts its affairs in the Secretariat offices (left) and its domed General Assembly building (right). Conference rooms and council chambers are in the building in front of the Secretariat skyscraper (*United Nations Photo*)





TOWN MEETING OF THE WORLD

In 1953 three permanent representatives of the U.N. joined in the first U.N. Town Meeting of the World, held in the Bristol, N.H., high-school gymnasium

(United Nations Photo)



INDUSTRIAL KNOW-HOW

Members of the U.N. pool their knowledge to help each other raise standards of living. Here, a simple machine helped Ecuador Indians improve the twine industry

(United Nations Photo)

A Disarmament Commission was established by the General Assembly on Jan. 11, 1952, to function under the Security Council. The commission, which replaces the Atomic Energy Commission and the Commission for Conventional Armaments, is to prepare proposals to be embodied in a draft treaty, or treaties: (1) for the regulation, limitation, and balanced reduction of all armed forces and all armaments; (2) for the elimination of all major weapons adaptable to mass destruction; and (3) for effective international control of atomic energy to ensure the prohibition of atomic weapons and to ensure the use of atomic energy for peaceful purposes only. The commission for 1958 was composed of 25 members. A subcommittee, consisting of Canada, France, Great Britain, the U.S., and the U.S.S.R. was established to assist the commission. At its 13th session, in 1958, the General Assembly decided that for 1959, and on an *ad hoc* basis, the commission would consist of all member states.

ECONOMIC AND SOCIAL COUNCIL. The council, composed of 18 members elected by the General Assembly, functions under the authority of the General Assembly. Six members are elected each year for a three-year term. A retiring member is eligible for immediate re-election. Each member has one vote and one representative. The council adopts its own rules of procedure, and decisions are made by a simple majority of the members present and voting. The council may invite any member of the U.N., which is not a member of the council, to participate without vote in its discussions. As a rule, it meets twice a year in regular session and in such special sessions as may be required.

The council may make or initiate studies and reports with respect to international economic, social, cultural, educational, health, and related matters and may make recommendations to the General Assembly, to the members of the U.N., and to the specialized agencies concerned. The council may also prepare draft conventions for submission to the General Assembly and call conferences on matters falling within its scope. It may further make recommendations for the purpose of promoting respect for, and observance of, human rights and fundamental freedoms. The council may furnish information to the Security Council and assist it upon its request.

SPECIALIZED AGENCIES. The U.N. Charter provides

that the various specialized agencies, established by intergovernmental agreement and having wide responsibilities in the economic, social, cultural, educational, health, and related fields, are to be brought into relationship with the U.N. by special agreements. The Economic and Social Council, under the authority of the General Assembly, is charged with the function of initiating agreements with these agencies and of coordinating their activities through consultation and recommendation. The U.N. may also initiate negotiations among the states concerned for setting up new agencies which are found to be necessary.

The 12 formally constituted specialized agencies are as follows: the International Labor Organization (ILO); the Food and Agriculture Organization of the U.N. (FAO); the U.N. Educational, Scientific, and Cultural Organization (UNESCO); the International Civil Aviation Organization (ICAO); the International Bank for Reconstruction and Development, and its affiliate, the International Finance Corp. (IFC); the International Monetary Fund; the World Health Organization (WHO); the Universal Postal Union (UPU); the International Telecommunication Union (ITU); the World Meteorological Organization (WMO); and the Intergovernmental Maritime Consultative Organization (IMCO).

Establishment of the International Trade Organization (ITO), designed to reduce tariff and other barriers to world trade and to help establish fair-trade rules, has been indefinitely postponed. However, one of its main objectives—easing trade barriers—is being promoted by 37 governments as Contracting Parties to the General Agreement on Tariffs and Trade (GATT), which has brought into operation a code of international trade. Members of GATT have also taken action envisaging a permanent agency to be known as the Organization for Trade Cooperation, which would administer the General Agreement.

The International Atomic Energy Agency (IAEA) came officially into being on July 29, 1957; although it is not a specialized agency, it is an autonomous international organization under the aegis of the U.N. The agency accelerates and enlarges the contribution of atomic energy to peace, health, and prosperity throughout the world. It assures as far as possible that assistance provided is not used in such a way as to further any military purpose.

There are many nongovernmental organizations which deal with important economic and social problems. Provisions have been made for relationships of a

consultative nature by the Economic and Social Council with such organizations. By June 1959 there were over 300 nongovernmental organizations which had been brought into consultative relationships with the council.

TRUSTEESHIP COUNCIL. There are certain territories under the administration of members of the U.N. which have not yet attained full self-government, and the members pledge themselves under the Charter to promote the well-being of the inhabitants of those territories.

The Charter provides for the setting up of an International Trusteeship System for the administration and supervision of such territories as are placed under the system by individual agreement. Three categories of territories may be placed under the trusteeship system: those held under mandate, those detached from enemy states as a result of World War II, and other territories voluntarily placed under the system by states responsible for their administration.

In December 1962 trusteeship agreements for the following territories were in force: New Guinea (partly administered by Australia); Western Samoa (administered by New Zealand); Nauru (administered by Australia on behalf of Australia, Great Britain, and New Zealand); and the Trust Territory of the Pacific Islands (administered by the U.S.). The last has been designated a "strategic area," and its agreement was approved by the Security Council rather than the General Assembly.

The trusteeship agreement for British Togoland ended in 1957, when the state of Ghana was established; that for Somaliland in 1960, when the state of Somalia came into existence; and that for Cameroons and Tanganyika in 1961, when the latter became an independent state and the Southern Cameroons joined the state of Cameroun. Ruanda-Urundi became the independent states of Rwanda and Burundi in 1962.

The Trusteeship Council consists of the members of the U.N. administering trust territories, those permanent members of the Security Council not administering trust territories, and as many other members elected for three-year terms by the General Assembly as are necessary to insure that the members of the Trusteeship Council shall be equally divided between those which administer trust territories and those which do not.

Each member of the council has one vote, and decisions are made by a majority of those present and voting. The council adopts its own rules of procedure and may avail itself of the assistance of the Economic and Social Council and of specialized agencies. It submits an annual report to the General Assembly. As a rule, it meets twice a year in regular session and in such special sessions as may be required.

As regards non-self-governing territories not placed under trusteeship, those members of the U.N. responsible for the administration of such territories have pledged themselves in the Charter to recognize the principle that the interests of the inhabitants of such areas are paramount and to accept, as a sacred trust, the obligation to promote their welfare. The administering authorities are bound by the Charter to transmit to the U.N. Secretary General information on the economic, social, and educational conditions in the territories. This information is analyzed by the Secretariat and then considered by a special committee established by the General Assembly—the Committee on Informa-

tion from Non-Self-Governing Territories. This committee is composed of seven members of the U.N. transmitting information and an equal number of members elected for three years by the Assembly's Fourth Committee on as wide a geographical basis as possible.

INTERNATIONAL COURT OF JUSTICE. The principal judicial organ of the U.N. is the International Court of Justice (*q.v.*).

SECRETARIAT. The Secretariat consists of a Secretary General and such staff as the U.N. may require. The Secretary General is the chief administrative officer of the U.N. He is appointed by the General Assembly on the recommendation of the Security Council. The Secretary General acts in that capacity at all meetings of the General Assembly, the Security Council, the Economic and Social Council, and the Trusteeship Council, and performs such other functions as are entrusted to him by these organs. He is required to submit an annual report to the General Assembly on the work of the U.N. The Secretary General may bring to the attention of the Security Council any matter which in his opinion may threaten international peace and security. The Secretariat is divided into a number of offices and departments and one administration.

See also *International Bank for Reconstruction and Development*; *International Labor Organization*; *International Monetary Fund*; *International Trade Organization*.

ACTIVITIES OF THE U.N.

POLITICAL AND SECURITY QUESTIONS: The primary purpose of the U.N. is to maintain international peace and security. During much of the time after its creation, the U.N. concentrated most of its efforts in the political field.

The most significant political decision of the U.N. up to 1958 was, undoubtedly, its determination to use armed force to repel aggression. On June 25, 1950, North Korean forces invaded the Republic of Korea. By an accident of history, the U.S.S.R. was not attending Security Council meetings at that time, and a U.N. Commission was in the Republic. In a subsequent report, the commission characterized the invasion as an act of aggression initiated without warning and without provocation in execution of a completely prepared plan. The U.N. acted swiftly. The Security Council called for a cessation of hostilities and the withdrawal of the invading forces. A Unified Command under the U.S. was formed. General support of the stand taken by the Security Council was expressed by 53 of the 60 members; 41 nations sent materials and supplies to Korea, 5 countries provided medical units, and 16 members provided armed forces in addition to those furnished by the Republic of Korea. After extensive military action, the fighting front was stabilized more or less along the 38th parallel—approximately across central Korea. An armistice agreement was signed

on July 27, 1953, thus bringing to an end military action recommended, for the first time in history, by an international organization to hurl back an aggressor. See also *Korea*.

The history of Korea resulted in an important step in the building of a worldwide collective security system under the U.N. When the Republic of Korea was invaded, the recommendation for collective U.N. action against aggression was made by the Security Council, where the negative vote by one permanent member could have prevented a decision. As a result of the "Uniting for Peace" resolution accepted by the Assembly in November 1950, such a recommendation could thenceforth be adopted by the Assembly, where there is no veto power.

The provisions of the "Uniting for Peace" resolution were used in 1956, when two critical situations arose, in Europe and Africa, on which the Security Council convened immediately. On Oct. 28, the Council met at the request of the U.S., France, and Great Britain to consider the situation in Hungary, where violence against the government had broken out, followed by strong Soviet armed intervention to put down the popular up-

rising. Two days later the Council met to consider an invasion of Egypt's Sinai desert area by Israeli armed forces; the Israeli action was followed by a landing in the Suez Canal region by combined British and French military forces. In both instances, the Security Council found itself unable to pass resolutions dealing with these developments. France and Britain vetoed draft resolutions relating to the Middle Eastern situation, while the Soviet Union vetoed a resolution calling on it to cease intervention in Hungary. Proposals to pass these questions on to emergency sessions of the Assembly were adopted.

The Assembly called unsuccessfully upon the U.S.S.R. several times to withdraw its forces, and the Secretary General was requested to investigate Hungarian conditions. Provision was made to aid the thousands of Hungarian refugees leaving Hungary. The U.S.S.R. informed the U.N. that Soviet troops were in Hungary at the request of the Hungarians and that the situation was purely an internal one, thus precluding the U.N. from intervening. Hungary refused U.N. observers permission to enter Hungary for the purpose of investigating conditions. The Assembly later condemned the U.S.S.R. for its violation of the Charter in depriving Hungary of its liberty and independence. A five-member special committee was established to investigate conditions in Hun-

U.N. EMERGENCY FORCE

In 1956 the U.N. sent troops from member states to the Middle East (*left*) to secure and supervise the end of hostilities brought about by the invasion of Egypt by Britain, France, and Israel. This first international police force of its kind in history remained in service after hostilities were halted, patrolling frontiers and acting as observers. The picture below shows members of the Irish contingent serving under U.N. direction in the Congo (Léopoldville) during international efforts to restore order in the former Belgian territory, which fell victim to civil war following its independence in 1960 (*United Nations Photo*)



gary and report to the Assembly. At its 13th session, in 1958, the Assembly, on the report of the special committee, denounced the execution of Imre Nagy, premier of Hungary at the time of the uprising, and Maj. Gen. Pal Maleter, his associate. At the same session the Assembly condemned the U.S.S.R. and the Hungarian government anew and asked them to cease repression in Hungary.

In the Middle Eastern situation the Assembly called for a cease-fire in Egypt and the withdrawal of non-Egyptian forces. A U.N. Emergency Force (UNEF) was established to secure and supervise the cessation of hostilities. The Assembly also urged, and the U.N. later provided, assistance in the clearing of the Suez Canal of obstructions and ships scuttled by the Egyptian government.

On Dec. 22, 1956—46 days after the Assembly's demand for the withdrawal of all foreign forces from Egypt—the last British and French troops were evacuated from Port Said, leaving the port and surrounding area under control of the UNEF and Egyptian police.

The withdrawal of Israeli forces from the Gaza Strip was completed on March 7, 1957, and from the Sharm el-Sheikh area along the Gulf of Aqaba and the Straits of Tiran to the southeast on March 8, about 17 weeks after Israel had crossed the Sinai Peninsula of Egypt.

Another significant achievement by the U.N. was the formal establishment on July 29, 1957, of the International Atomic Energy Agency, after almost three years of negotiations, which began after an address by President Eisenhower, of the U.S., to the General Assembly on Dec. 8, 1953 (see also SPECIALIZED AGENCIES, *above*).

A 15-member scientific committee for the study of the effect of nuclear radiation on man and his environment was established by the General Assembly in December 1955. Its first report covering, among other matters, the genetic effects of radiation, which was released in August 1958, warned against the rising level of radioactivity in the world. It pointed out that radioactivity is a threat to both living and future generations. The committee continues to exist.

Other accomplishments of the U.N. were:

The question of Communist-organized guerrilla warfare in Greece was brought to the Security Council by Greece in December 1946. At that time, Greece stated that the support by Albania, Bulgaria, and Yugoslavia to Greek guerrillas fighting against the Greek government was leading to friction with those countries. The U.N. played a significant "observer" role in Greece. The northern borders of Greece were progressively pacified, and open conflict did not occur; on Aug. 1, 1954, the U.N. Military Observer Mission in Greece, at the request of the Greek government, was discontinued.

After Security Council discussion, Soviet troops

were evacuated from Iran and British and French troops were withdrawn from Syria and Lebanon in 1946.

An incident which threatened to break out into an armed conflict was the Berlin Blockade, resulting from the imposition by the U.S.S.R. of restrictions on transport and communications between the Western zones of occupation in Germany and Berlin. Although successful U.N. intervention was blocked, the U.N. did serve as a common meeting ground for U.N. representatives of the four powers concerned, and the lifting of the blockade was brought about in May 1949 through discussions of these representatives.

As a result of U.N. intervention, hostilities between The Netherlands and Indonesia were brought to an end. On Dec. 27, 1949, The Netherlands transferred full sovereignty over the whole of the territory of the Netherlands Indies, with the exception of Netherlands New Guinea, to Indonesia.

In 1962 the 17th Assembly session approved (Sept. 21) an Indonesian-Dutch agreement which gave 160,000 sq. m. of the western half of New Guinea to Indonesia, with a provision that a plebiscite should be held at some future time among the Papuan people of the territory.

Armed conflict erupted between France and Tunisia in 1961 over French use of the military base at Bizerte. Tunisia blockaded the base and France retaliated with air, sea, and land attacks on Bizerte and other towns, inflicting severe casualties. Both the Security Council and the General Assembly called on both sides to withdraw their troops to previously held positions. After some debate in the Security Council and the Assembly, France and Tunisia agreed to a cease-fire and resumption of direct negotiations.

While many of the political problems dealt with by the U.N. had been concluded successfully, some resulted in only a limited success or in no success. From its beginning, the U.N. had made continuous efforts to achieve disarmament, so that the money, materials, and human endeavor devoted by most nations to arms and their armed forces could be used for the betterment of mankind. Up to 1951, two U.N. commissions had been engaged in preparing separate recommendations—the Atomic Energy Commission (established in 1946) and the Commission for Conventional Armaments (established in 1947). As no progress was made by either, the General Assembly, in January 1952, established a new Disarmament Commission (combining the functions of both commissions) and abolished the two previous commissions; efforts to achieve disarmament continued.

Armed hostilities between India and Pakistan over the status of Kashmir broke out in early 1948. A U.N. cease-fire was put into effect, and

the U.N. began to seek a permanent solution to the question.

The establishment in 1960 of the Belgian Congo as the independent Republic of the Congo (Léopoldville) involved the U.N. in one of the most difficult problems of its history. As civil war broke out among provincial factions in the new state, the Security Council authorized the secretary general to give military assistance to the central Congolese government. Crisis followed crisis, and the U.N. force in the Congo was hampered in its efforts by lack of funds and by withdrawal of troops of various nations which disagreed with the U.N. military policy. The situation was aggravated by growing tribal conflict, by the slaying in February 1961 of deposed Premier Patrice Lumumba, and by the efforts of Pres. Moïse Tshombe of Katanga to make his province independent. The General Assembly in 1961 adopted resolutions calling for withdrawal of all Belgian military personnel and civilians, the reconvening of the national parliament, and the formation of a broad government to reconcile the central government with dissident factions.

The neutral position of the secretary general in the Congo conflict was a major factor in the increasing Soviet attacks against the office and the incumbent—Dag H. Hammarskjöld. The Soviet proposal for a "troika" organization of the secretariat—three members, one each from the Eastern, Western, and neutral nations—was rejected by the Western members and many unaligned countries. After Hammarskjöld's death (Sept. 8, 1961), the matter was resolved by election of an acting secretary general, U Thant of Burma. After further debate the Soviet Union waived its troika plan, and in 1962 U Thant was elected for a four-year term.

Nevertheless, the Congo continued to occupy much U.N. attention, and U Thant in 1962 sought to impose economic sanctions against Tshombe to force reintegration of Katanga with the central government.

The U.N. contributed important services to world peace in two major fields in 1962. In the Cuban crisis, which arose in October when the Soviet Union was revealed to have installed a large quantity of offensive weapons on the island, and the U.S. declared a naval quarantine, U Thant acted as mediator between the two powers in an effort to prevent a direct confrontation between the world's great nuclear powers.

The U.N. succeeded in 1962 in achieving a Dutch-Indonesian agreement on West New Guinea, placing the territory temporarily under control of the U.N. It is later to pass to Indonesian control, and the people's choice of political destiny is to be determined eventually by plebiscite.

ECONOMIC AND SOCIAL QUESTIONS: Quite often, economic and social difficulties are at the very

root of political disturbances. The U.N. attempts to alleviate economic and social difficulties throughout the world. The more prosperous nations are becoming increasingly aware of the fact that much of their prosperity depends on development of the less developed nations.

Under the U.N. Charter, members promised to work separately and together to bring about higher standards of living and agreed to use international machinery to promote the economic and social progress of all people. From the beginning, both the U.N. and the specialized agencies gave practical help to this end. Technical-assistance programs were set up through which expert advice and technical skills of all their member countries were made available to less developed countries to help them help themselves in improving living conditions.

To increase and to coordinate this help and to pool the skills of as many countries as possible, despite different traditions and different stages of development, the U.N. established an Expanded Program of Technical Assistance for Economic Development of Under-Developed Areas, in which the U.N. and several of the specialized agencies were to take part; it began operations in July 1950.

Unlike the regular programs of the U.N. and the specialized agencies, which are paid for from their regular budgets, the Expanded Program is financed from a special account to which governments contribute voluntarily on a yearly basis. The sums contributed to this special fund have grown steadily; the average total for the past several years was about \$25,000,000 annually. In an effort to expand technical-aid activities, the General Assembly, in 1957, decided to establish as of January 1959 a separate U.N. Special Fund which would provide systematic and sustained assistance in fields essential to the integrated technical, economic, and social development of the less-developed countries. The fund, together with the existing technical-assistance funds, is not likely to exceed \$100,000,000 annually.

Technical assistance takes several forms. One of the most important is providing the services of experts to help the governments of less developed countries carry out their own plans for building up their skills and resources. Another form of aid is the award of fellowships and scholarships to nationals in less developed countries to make it possible for them to obtain wider training abroad. Seminars, training centers, demonstration projects, and pilot plants are also conducted in the under-developed countries themselves, usually on a regional basis. Some demonstration equipment is also supplied as a form of technical assistance, but in very small amounts and only in connection with the work of the experts.

Since the beginning of the program in July

UNITED NATIONS

1950, over 8,000 experts, drawn from about 80 different nationalities, had gone out (by June 1959) to serve in over 125 countries and territories. During the same period, over 16,000 fellowships and scholarships were awarded to the nationals of more than 120 countries.

More than technical skills, however, are required to develop and modernize industries, to expand farming output, or to improve educational, health, social welfare, and civil services. Capital is necessary, and resources available to the less developed countries are inadequate for speeding the rate of economic development. The International Bank for Reconstruction and Development (*q.v.*), a U.N. specialized agency, is aiding in this respect. The International Finance Corp., an affiliate of the bank, was formed in July 1956 for the purpose of encouraging the growth of productive private enterprise, particularly in the less developed areas of the world.

The U.N., by establishing four regional economic commissions—for Europe, Asia and the Far East, Latin America, and Africa—also enables the nations of these regions to cooperate on common difficulties.

The U.N. gives aid and protection to refugees through the office of a high commissioner. A U.N. Refugee Emergency Fund was established



HOPE FOR REFUGEES

Resettlement of refugees is a major U.N. activity. These aged Europeans in Hong Kong are flown to nations which are ready to welcome them (*United Nations Photo*)

in 1954 to promote the settlement on a permanent basis of unassimilated refugees, particularly those still living in camps, as well as to provide emergency assistance for particularly needy cases. To help Palestine refugees in the Near East, a special fund and a special agency—the U.N. Relief and Works Agency for Palestine Refugees in the Near East—were established. The U.N.

MUTUAL ENDEAVOR

An example of the progress possible through joint effort among U.N. members is the development project on the Mekong River undertaken by Cambodia, Laos, Thailand, and Viet Nam. The fishermen shown here are using a wooden fish trap in a narrow part of the river, in Cambodia (*courtesy United Nations*)



Convention Relating to the Status of Refugees set minimum rights for refugees, to be observed by governments party to this treaty. The U.N. also worked out another international agreement intended to give benefits available under the convention to people without nationality.

Through UNICEF (the U.N. Children's Fund), the U.N. provides food supplements and supplies for disease-control campaigns and maternal and child-welfare projects in under-developed areas of the world. In 1959 the fund was aiding more than 100 countries in disease-control and nutrition programs which would benefit over 45,000,000 children.

The U.N. works to further the observance of basic human rights; it proclaimed a Universal Declaration of Human Rights as a common standard for all peoples and all nations. A convention for the prevention and punishment, as a crime under international law, of genocide (*q.v.*) became effective in 1951.

The U.N. works to improve the status of women through its Commission on the Status of Women. A worldwide system of control over dangerous drugs, such as opium and cocaine, is also part of the work of the U.N.

TRUSTEESHIP AND NON-SELF-GOVERNING TERRITORIES: The U.N. takes a special interest in the welfare and progress of the millions of people in dependent territories, whose self-government or independence is to be developed or promoted. The administration and supervision of certain territories have been placed under an International Trusteeship System. The member nations responsible for other non-self-governing territories report regularly, for information purposes, on the

economic, social, and educational conditions of the inhabitants. Through the U.N., the world is kept alive to the aspirations and advancement of these peoples. Missions of the U.N. regularly visit trust territories to study conditions and make recommendations. In addition, hundreds of petitions are examined by the U.N.

As regards other non-self-governing territories not placed under the International Trusteeship System, a number of constitutional changes took several of the dependent territories far along the road to autonomy and, indeed, attained that goal for a number of them. Thus, the U.S. announced to the General Assembly that Puerto Rico (*q.v.*) on July 25, 1952, had been granted commonwealth status and had therefore ceased to be a non-self-governing territory. Denmark stated that Greenland had become an integral part of the Danish realm on June 5, 1953, with rights corresponding to those of other parts of Denmark. The Netherlands, in 1955, informed the U.N. that Surinam and the Netherlands Antilles had become a part of the kingdom.

DEVELOPMENT OF INTERNATIONAL LAW: One of the important aims of the U.N. is to establish conditions under which justice and respect for the obligations arising from treaties and other sources of international law can be maintained. Virtually all important developments in the evolution of international law after 1945 were closely connected with the U.N. The Charter itself, which is a constitution for international conduct, has become the central instrument of international law, and one of the most important features of the development of the law is the continuing and cumulative effort to imple-



SECRETARIAT HEAD

U Thant of Burma was unanimously elected Secretary General of the U.N. on Nov. 30, 1962, after serving as acting secretary since the death of Dag H. Hammarskjöld in 1961. Thant is shown here (left) being congratulated by Muhammad Zafrullah Khan of Pakistan, president of the 17th session of the General Assembly. Looking on is C. V. Narasimhan, under secretary for General Assembly affairs (United Nations Photo)

ment the Charter in all of its many aspects.

The various specialized agencies were established by intergovernmental agreement. The basic instruments (constitution, convention, articles of agreement, charter) of these agencies are similar to international treaties and are respected as such by nations.

The General Assembly established a special body, the International Law Commission, charged with promoting the progressive development of international law and its codification.

In 1958 a draft international convention prepared by the commission on the law of the sea—a complex and difficult subject—was considered by a U.N. conference on the subject. The conference adopted four international conventions relating to territorial seas, fishing rights and conservation measures, and exploration and exploitation of the resources of the continental shelf.

Each judgment and advisory opinion of the International Court of Justice clarifies and helps to develop international law. From its establishment in 1946, the court has delivered judgments concerning such legal questions as, for instance, the responsibility of a country for the sinking of warships, the violation of territorial waters, the question of extraterritorial rights, the obligation of a party to a dispute to submit it to arbitration, and the determination of sovereignty over a disputed territory.

Advisory opinions given by the court have concerned such questions as the determination of the legal status of a mandated territory, the position of a state attaching reservations to a convention, the admission of new members to the U.N. and the competence of the General Assembly with regard to the admission of new members, and the interpretation of certain peace treaties.

United Nations Relief and Rehabilitation Administration (UNRRA), a temporary international agency which operated from Nov. 9, 1943, until Sept. 30, 1948. The agency was established to aid liberated countries in financing the importation of relief and rehabilitation supplies. At the peak of its strength UNRRA was composed of 48 member nations. Total contributions to UNRRA amounted to \$3,968,392,725, of which the U.S. gave \$2,668,269,449.

United Provinces of Agra and Oudh (*ā'grā ānd oudh*). See *Uttar Pradesh*.

United Service Organizations (U.S.O.). See *Service Clubs*.

United States, a federal republic, the political division which occupies the central part of North America, the most powerful nation in the world, called officially the *United States of America*. It is bounded on the n. by Canada, on the e. by the Atlantic, on the s. by the Gulf of Mexico

and the Republic of Mexico, and on the w. by the Pacific. The greatest extent from east to west is 3,100 m.; from north to south, 1,780 m. Its area is 3,022,387 sq. m., exclusive of the noncontiguous states of Alaska and Hawaii (*qq.v.*). The total area of the U.S., including its states, possessions, and other dependencies, is 3,628,130 sq. m., an expanse of territory larger than all of Europe. For information on the political divisions and the possessions and dependencies of the U.S., the reader is referred to the articles in which they are treated separately.

The following table lists the principal possessions and other dependencies, together with the area, population, and the date of acquisition. See *Puerto Rico*.

| U.S. Possessions | Area (sq. m.) | Population (1960) |
|--------------------------|------------------|----------------------|
| American Samoa (1900) | 76 | 20,051 |
| Virgin Islands (1917) | 133 | 32,099 |
| Guam (1898) | 212 | 67,044 |
| Panama Canal Zone (1903) | 353 | 42,122 |
| Total..... | 974 | 161,316 |

BOUNDARIES. The 49th parallel forms the northern boundary of the mid-continental U.S. (the 48 states) from the Strait of Georgia, an inlet of the Pacific, to the Lake of the Woods, in northern Minnesota. This line is the most northern part of the mid-continental U.S., except for a small peninsula in the western part of the Lake of the Woods, which extends about 25 m. farther north. From the Lake of the Woods, the northern boundary extends eastward along the channel of the Rainy and the Pigeon rivers and through lakes Superior, Huron, Erie, and Ontario, dividing these lakes about equally between the U.S. and Canada; however, the larger part of Lake Superior belongs to the U.S. East of Lake Ontario the boundary extends a short distance along the main channel of the St. Lawrence River, to the 45th parallel, which it follows along the northern border of New York and Vermont; thence it passes northeast along the border of New Hampshire and Maine. From the northerly point of Maine it extends southeast, following partly the St. John River; then it extends along an arbitrary line to the St. Croix River, which it follows to the Atlantic. The Atlantic coast line, which is 2,350 m. long exclusive of indentations, is characterized by a number of large bays and inlets, which include Penobscot, Cape Cod, Chesapeake, New York, Massachusetts, Delaware, and Narragansett bays and Long Island, Pamlico, and Albemarle sounds.

The southern boundary is partly formed by the Rio Grande, from the Gulf of Mexico to about the mid-southern border of New Mexico, whence the boundary follows an arbitrary line to the Colorado River. From the point of intersection of the arbitrary line and the Colorado, the border follows that stream northeast to the mouth

of the Gila River, whence it runs almost due west to the Pacific. The western coast is indented by San Diego, San Francisco, and Willapa bays, Grays Harbor, and Admiralty Inlet, an extension from Juan de Fuca Strait. In the northwest, the border is formed by Juan de Fuca Strait, the Canal de Haro, and the Strait of Georgia, which separates the country from Vancouver Island. The total coast line of the mid-continental U.S., including inlets but excluding the Great Lakes, is 12,877 m. This embraces 2,410 m. on the Pacific, 4,097 on the Gulf of Mexico, and 6,370 on the Atlantic. There are also 3,774 m. of Great Lakes shore line and an additional 6,542 m. of continental coast line of Alaska.

ISLANDS AND PROJECTIONS. Islands off the Atlantic coast include Long, Manhattan, and Staten islands, Nantucket, Martha's Vineyard, Roanoke, and the Florida Keys. In the Gulf of Mexico are the islands of Santa Rosa, Galveston, St. George, the Dry Tortugas, Padre, Matagorda, and the Chandeleur group. The San Juan, Santa Catalina, and Santa Cruz islands are off the Pacific coast, and, in the Pacific, there is the island group comprising the State of Hawaii.

Three large peninsulas project from the mid-continental U.S. They are Florida, between the Atlantic and the Gulf of Mexico; Lower Michigan, between Lakes Huron and Michigan; and Upper Michigan, between Lakes Superior and Michigan. Projections on the Atlantic coast include Cape Cod and Cape Hatteras; on the Gulf coast, Cape Sable, Cape San Blas, and the Mississippi Delta; and on the Pacific coast, Capes Mendocino, Blanco, and Flattery. Separated by Canada from the other continental states is Alaska. The easternmost point of the Americas, it lies between the Arctic and North Pacific oceans and faces the U.S.S.R. across the Bering Strait.

GENERAL DESCRIPTION. The U.S., except for Hawaii, northern Alaska, and some of its island possessions, is wholly within the North Temperate Zone. It has great diversity of surface, climate, soil, and products. Five natural regions, varying in slope and elevation, make up the mid-continental U.S. These include the Atlantic slope, the Appalachian highlands, the Mississippi Valley, the western highlands, and the Pacific slope.

The *Atlantic slope* is situated between the Atlantic and the Appalachian Mts. Only a few miles wide in the north, it gradually widens toward the south, forming an expanse of about 300 m. where it joins the plains of the Gulf of Mexico. A narrow belt lying along the sea is known as the Atlantic coast plain. It gradually rises toward the west, and finally merges into the Piedmont plateau, which comprises the Appalachian foothills and consists chiefly of a plain from a few hundred to 1,000 ft. above the sea.

The drainage of the Atlantic coast plain is

toward the southeast into the Atlantic. Most of the rivers are small, but they flow with considerable rapidity and supply abundant water power to many cities. The chief rivers of this region include the Penobscot, Kennebec, Hudson, Connecticut, Delaware, Potomac, Susquehanna, Roanoke, James, Neuse, Cape Fear, Pee Dee, Santee, St. Johns, and Savannah.

The *Appalachian highlands* consist of several parallel ridges and chains, having a breadth of about 100 m. and including many long valleys. Some of the valleys are stony and unproductive, but others enjoy remarkable fertility. The mountains are comparatively low; only a few of the peaks exceed 6,000 ft. The highest ranges are the Blue Ridge Mts. in North Carolina and the White Mts. in New Hampshire. Mount Mitchell is the highest peak of the Blue Ridge and Mt. Washington of the White Mts. Both rainfall and climatic conditions are quite favorable in the Atlantic coast plain and the Appalachian highlands, hence a considerable part of the region is covered with grasses or is adaptable for farming. These two regions are the seat of many noted manufacturing cities and are traversed by numerous canals, highways, and railroads.

The *Mississippi Valley* comprises the great central plain lying between the Appalachian highlands and the Rocky Mts. It contains more than two-fifths of the territory in the mid-continental U.S. and about half of the population. This region is the most productive farming and stock-raising section of North America. Extending northward to the Great Lakes, it includes the lake region, which consists of Michigan and portions of Ohio, Indiana, Illinois, Wisconsin, and Minnesota. The drainage is by the Mississippi and its vast network of tributaries, including the Wisconsin, Illinois, Ohio, and Yazoo from the east, and the Minnesota, Des Moines, Missouri, White, Arkansas, Washita, and Red from the west. The Mississippi and its tributaries drain five-twelfths of the U.S., or 1,250,000 sq. m. The surface is chiefly an undulating plain, with belts of timber along the streams in the north and widespread forests in the south. The average elevation of the Mississippi Valley region is about 1,000 ft. above sea level. The surface of the land rises gradually from the Gulf of Mexico, where the elevation is only a few feet; in the central part it is about 1,000 ft., and in the northern portion it reaches *ca.* 1,900 ft. The Ozark Mts., a low range of highlands, traverse parts of Missouri, Oklahoma, and Arkansas; and another group of mountains, the Black Hills, is situated on the boundary between Wyoming and South Dakota. There is a general rise from the 99th meridian westward, and the region between it and the Rocky Mts. is more or less elevated. This region, called the Great Plains, ranging in width

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from 200 to 1,000 m., extends from the Gulf of Mexico to the Canadian line. Much of the soil is naturally fertile, with some sandy areas in the western part. A lack of rainfall makes irrigation necessary for the production of crops in portions of these plains, especially in eastern Colorado and Wyoming and western Nebraska, Kansas, and Oklahoma.

The *western highlands* include the region occupied by the Rocky Mts., the Coast Ranges, the Cascade Range, and the Sierra Nevada. This section is from 500 m. to 1,000 m. wide and comprises many elevated ridges and extensive valleys; nearly all of it is more or less arid. The Rocky Mts. constitute the eastern chain of the highlands, forming the watershed between the Mississippi system and the rivers farther west. Between the Rocky Mts. and the Cascade Range and Sierra Nevada is the great plateau that includes the Wasatch Range and Great Salt Lake. Some peaks of the Rockies attain heights of 12,500 ft. to 15,750 ft. Their summits are always covered with snow and their slopes with hardy evergreen trees. Many of the great rivers of America have their source in the Rockies, among them the Missouri, Colorado, Platte, Arkansas, Red, Rio Grande, Pecos, Columbia, and Yellowstone. In the Great Basin are the Bear and Jordan rivers, flowing into Great Salt Lake, and the Humboldt, flowing into Humboldt Lake, in Nevada. Between the Sierra Nevada and the Coast Ranges is the fertile valley of central California, through which flow the Sacramento and San Joaquin rivers. Here may be found many lakes, beautiful waterfalls, and scenic canyons.

The *Pacific slope* includes the region west of the Cascade Range and the Sierra Nevada. The terrain is varied, with numerous valleys and mountain groups. Besides the Sacramento and San Joaquin rivers, it includes the Willamette, Umpqua, Rogue, Eel, Deschutes, Salinas, and Klamath rivers and the lower course of the Columbia. The Pacific coast, stretching a distance of 2,280 m. from Lower California to Juan de Fuca Strait, has precipitous and rocky shores. The principal inlets include the bays of San Diego, San Francisco, and Monterey. Puget Sound, an inlet of the Pacific through Juan de Fuca Strait and Admiralty Inlet, is in the northwestern part of Washington. Death Valley, a depression in southern California, is about 300 ft. below the level of the sea.

DRAINAGE AND NAVIGATION. The rivers furnish about 24,500 m. of navigation facilities. Many of the principal streams have already been mentioned under the five natural divisions of the surface of the U.S. However, the drainage may be classified into five distinct divisions, depending upon the direction in which their waters flow to reach the sea. These include the rivers that be-

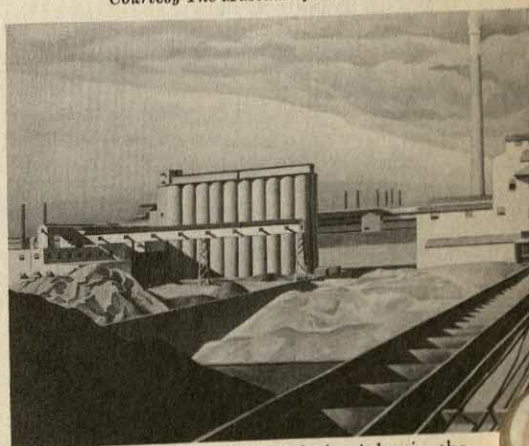


Courtesy New York Graphic Society

20th-CENTURY AMERICA THROUGH THE ARTIST'S EYE

Vermont Farm. Painting by James M. Sessions (*above*)
Classic Landscape. Painting by Charles Sheeler (*below*)

Courtesy The Museum of Modern Art, N. Y.



long to the systems of the Gulf, the Atlantic, the Pacific, the Great Lakes, and the Great Basin. In importance, they rank in the order named, considering both volume of water discharged and relative commercial importance. The Gulf system, besides the Mississippi and its tributaries, includes the Apalachicola, the Alabama, the Tennessee, the Sabine, the Pearl, the Trinity, the Brazos, the Colorado in Texas, the Nueces, and the Rio Grande. While they are all more or less important in navigation, the rivers flowing through the arid region of the Great Plains serve mainly for irrigation. Few of the rivers belonging to the Great Lakes system are large, but the St. Lawrence, which forms the outlet to the sea, has great value as a commercial waterway. Other major rivers of this system include the St. Louis, the Maumee, and the Genesee.

The river beds of the Atlantic coast plain are characterized by high rock faces 40 m. to 100 m. away from the sea, hence the navigation in most cases extends only this far. Many of the rivers discharge into broad estuaries, which provide fine harbors, such as those of the Delaware, the Hudson, and the Potomac rivers. Only two of

the rivers belonging to the Pacific slope are large in size, but many are important because they pass over steep rock faces, thereby furnishing vast amounts of water power, and because of their usefulness for irrigation in the arid regions. The Columbia, in the Northwest, and the Colorado, in the Southwest, are the largest rivers of the Pacific system. The Columbia rises in Canada, is joined by the Snake in Washington State, and discharges into the Pacific at the Washington-Oregon border. The Colorado is joined by the Green. A part of the lower course of the Colorado is in Mexico, where it enters the Gulf of California. Three rivers in the extreme West are the Willamette, in Oregon, and the Sacramento and the San Joaquin in California. The Great Basin system has many streams used for irrigation. The system has no outlet to the sea, and much of the drainage is into the Great Salt Lake, Utah, by numerous small streams, including the Sevier River. However, the largest stream of this section, the Humboldt, empties into Humboldt Lake.

LAKES. In the northern section of the mid-continental U.S., especially in Michigan, Wisconsin, and Minnesota, there are many hundreds of small fresh-water lakes. In the north also are the Great Lakes: Lakes Superior, Huron, Erie, and Ontario, which form a part of the northern boundary, and Lake Michigan, which lies wholly within the U.S. Other well-known lakes are Moosehead, in Maine; Winnepesaukee, in New Hampshire; Champlain, between New York and Vermont; Oneida, Cayuga, George, and Seneca, in New York; Okeechobee, in Florida; Winnebago, in Wisconsin; Pontchartrain, in Louisiana; Red, Leech, and Mille Lacs, in Minnesota; Devils, in North Dakota; Flathead, in Montana; Yellowstone, in Wyoming; Utah, Sevier, and Great Salt, in Utah; upper Klamath and Crater, in Oregon; Mono, Owens, and the Salton Sea, in California; and Tahoe, on the boundary between California and Nevada.

CLIMATE. The climate and soil of a region as vast as that included in the U.S. are necessarily diversified. In the southern part, as in California and Florida, the climate is almost tropical, and there is a gradual fall in the average temperatures toward the higher altitudes and toward the northern part of the country. However, every part of the mid-continental U.S. has a favorable climate. The winters are cold in the northern part, but not to such an extent that the well-being of man and domestic animals is affected, and summers in the region are generally pleasant. In the western highlands and the Great Plains, rainfall is limited, but all other sections have abundant moisture for the growing of cereals and root crops, vegetables, and fruits. The normal annual rainfall for places east of the

Missouri and Mississippi rivers ranges from about 25 in. to 60 in.; for areas between the Missouri River and the western highlands, it ranges from about 10 in. to 40 in. In the western highlands, where some sections are virtually rainless, from about 5 in. to 15 in. of precipitation fall in a normal year; and in the regions along the Pacific coast the normal range of rainfall is from 15 in. to 40 in. a year. One of the wettest regions of the country lies around the Gulf of Mexico, where precipitation ranges from about 45 in. to 60 in.

The mean annual temperature has a corresponding variation in the different sections of the country. It is about 70° F. in the southern parts which are not materially affected by elevation or sea breezes, 55° throughout the central region, and from 45° to 50° in the northern part. In the north central section the average daily minimum temperature may fall as low as zero, and occasionally the temperature falls to an extreme low of 60° below zero in parts of Montana and Wyoming. On the other hand, the highest readings are reached in the drier parts of Arizona and Texas, where the average daily maximum temperature during the summer ranges between 95° and 100°, rising as high as 115° in Texas and 120° in southwestern Arizona.

Climate, which is usually described in terms of means, extremes, and frequencies of weather elements, is an expression of the weather environment at a place or in a region over a long period of time. It is determined by the long-term integrated effects of the various air masses (extensive bodies of air) and storm systems that move across the country, bringing changes in temperature, precipitation, wind, and other weather elements. The stormiest portion of the U.S. is in the Great Lakes region, where a large proportion of the storms that originate in the Far Northwest move eastward along the northern border and finally pass off the North Atlantic coast. The winds associated with these storm centers cause a wide range in temperature throughout the year, resulting in an invigorating climate.

The wide range of rainfall and temperature is important as a factor in the yield of agricultural products, for which the country is noted. The most productive lands lie along the eastern coast plain and the rivers of the great interior, but by far the largest area of productive and arable land is within the Mississippi basin. Extensive regions of the western highlands have fertile soil, but they lack sufficient moisture to make agriculture dependable; large tracts are entirely sterile, as in many parts of the Utah basin. Vast regions are employed principally for grazing, as the plains of western South Dakota, Nebraska, Kansas, Oklahoma, eastern Colorado and Wyoming, and northwestern Texas.

NATURAL SCENERY. The U.S. is unsurpassed in

beautiful scenery. Niagara Falls, the most noted cataract in America, is surpassed in the volume of water passing over it only by Iguasso Falls and Victoria Falls. Yosemite Falls, in California, has a total height of 2,525 ft., in a series of three falls. The Yellowstone Falls, in northwestern Wyoming, is one of the wonders of the Yellowstone National Park. Shoshone Falls, on the Snake River, is next to Niagara among the falls of America in the volume of water passing over the precipice. The trip up the Hudson, from New York City to Albany, has few rivals in scenic attraction. Another trip of great beauty is from Portland, Ore., down the Willamette to the Columbia, thence up the Columbia to The Dalles. In the Appalachian highlands are beautiful mountain lakes and deep gorges, through which clear streams wind. The Water Gap, in the Delaware; the Palisades, on the Hudson; and Crawford and Franconia Notches, in the White Mts., are scenes of great grandeur. Other scenery of remarkable beauty includes the Natural Bridge, in Virginia; the Mammoth Cave, in Kentucky; the Grand Canyon of the Colorado; the Whirlpool and Gorge, on the Niagara; and the waterfalls and cliffs of the Yosemite Valley. Yellowstone National Park is a wonderland of canyons, waterfalls, geysers, and thermal springs. Various other tracts of land, important for their scenic or historic interest, have been set aside and reserved by the Federal government. See *Parks, National*.

FORESTS AND PLANT LIFE. The forests are valuable and extensive. Scarcely any section of the country is entirely destitute of plant growth, and there is a large area of timber. Forests of valuable native woods extend throughout the regions which have an abundance of rainfall, yielding large quantities of lumber and other timber products. Considerable growths of cedar and other evergreen trees are found even in the arid highlands of the West. All of the region east of the Mississippi was formerly rich in primeval timber, and fine tracts still remain in many sections. A continuation of these forests extends into the section comprising Missouri, Arkansas, Louisiana, Oklahoma, eastern Texas, eastern Kansas, and southern Iowa. The prairies of the northern Mississippi Valley are enriched by belts of timber along the streams. In the western highlands are other scattered belts, particularly in the canyons and valleys and on the mountainsides. In the region of the sources of the Mississippi and along the southern shore of Lake Superior splendid forests still abound. This is also true of Washington, Oregon, and California, where the redwood and other great trees of the North American continent thrive.

Only limited tree growth is found in the western sections of the Great Plains, though there are groups and belts of cottonwood, box elder,

and willow trees along the streams. In the *Llano Estacado*, or Staked Plains, of Texas and New Mexico, tree growth is very limited or entirely absent. Among the most abundant trees of North America are the oak, beech, ash, black and white walnut, maple, hickory, locust, buckeye, laurel, cypress, azalea, magnolia, tulip, elm, pine, catalpa, cedar, arbor vitae, persimmon, redwood, guava, holly, acacia, fir, hackberry, pecan, birch, dogwood, palmetto, and hemlock spruce. The redwood and big tree, two species of the sequoia, found in California, are the largest trees of North America. In 1957 there were 188,013,378 acres in 151 national forest areas, of which about 167,000,000 acres were in the mid-continental U.S. and 20,700,000 in Alaska. See *Forest; Forestry*.

The plants native to the U.S. exceed in number those of Europe, the trees alone including about 400 species. As a whole, the plant life is characteristic of the temperate zone, but it assumes a semitropical form in the southern part, as in Louisiana and Florida, where much of the vegetation resembles that of the West Indies. The native grasses are numerous, ranging from the large forms of the Dismal Swamp (*q.v.*) to the small and highly nutritious buffalo grass of the arid regions of the West. The latter, in many sections, is interspersed with cacti, bunch grass, and sagebrush. Indian corn, or maize, and tobacco, two plants of high economic value, are native to the U.S. Practically all of the more valuable commercial plants of Europe and Asia are grown on a large scale in the U.S., including cotton, rye, oats, wheat, barley, clover, beans, oranges, lemons, etc.

ANIMAL LIFE. Formerly, vast herds of wild animals inhabited the different sections now within the U.S. Buffalo, elk, deer, and antelope were abundant in the Mississippi Valley and the western plains, and great flocks of aquatic birds made their homes in the interior waters. The rapid settlement of the country sharply reduced the wild-life population, and at the present time scattered remnants of many species are found only in remote and sparsely settled areas, such as the mountainous areas of the West. The buffalo, or bison, which had disappeared almost entirely, is now increasing in herds inhabiting the national parks. Elk, deer, antelope, and kindred animals, which were formerly very abundant, are now quite limited. Those remaining are confined largely to the mountains and highlands. The animals still fairly abundant include the badger, bear, muskrat, wildcat, prairie dog, panther, skunk, weverine, hare, lynx, raccoon, rabbit, mountain porcupine, mink, squirrel, woodchuck, fox, wolf, and cougar.

Many species of birds are native to the country, particularly in the Southern states, and aquatic birds are numerous in some districts.

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FISHERIES. The fishing industry of the U.S. had its origin in New England during the colonial period, and the enterprise has grown to such an extent that the U.S. now leads the world in the monetary value of the output. Although it seemed probable that some species of fish might be exterminated from a lack of definite knowledge of methods of propagation, much has been done by the government and the states to obviate this possibility. Hatcheries are maintained under the direction of the U.S. Fish and Wildlife Service, by which extensive investigations and experiments are promoted. Both the interior waters and those lying off the coasts are valuable fishing grounds. Whaling was a productive enterprise until the middle of the 19th century, when the whale abandoned the waters off the coasts for seas farther north and south. Some whaling is still being done in the polar seas. The states that border the Gulf, the Great Lakes, the Atlantic, and the Pacific have the largest fishing industries. Sponges, shrimps, and pearls are obtained off Florida and California. Lobsters and clams are taken off the coast of Maine, and oysters are abundant in Chesapeake Bay and Long Island Sound. The salmon fisheries of the Columbia River and Alaska yield large returns; buffalo fish, catfish, and carp are plentiful in many waters. Sealing is profitable in the Alaskan seas. The Great Lakes yield whitefish, lake trout, and herring. Cod, bluefish, halibut, and menhaden are among the leading fishes of the Atlantic. Other species include the mackerel, perch, mullet, shad, ray, eel, pike, carp, and scallop. In 1957 about 142,000 commercial fishermen were employed. During the year, they caught 4,750,000,000 lb. of fish, receiving \$351,000,000 for their catch.

MINERAL RESOURCES. Coal reserves of the U.S. are estimated at 1,900,000,000,000 tons, of which 14,000,000,000 tons is anthracite or hard coal, 1,050,000,000,000 tons bituminous coal, 372,000,000,000 tons sub-bituminous coal, and 464,000,000,000 tons lignite. The annual production reaches about 500,000,000 tons. Coal is mined in more than 20 states, but the largest producers are Pennsylvania, West Virginia, Kentucky, Illinois, Ohio, Virginia, Alabama, Indiana, Utah, Wyoming, Tennessee, Colorado, Oklahoma, Missouri, and Kansas. The average daily employment is *ca.* 300,000 men. In 1958 about 400,000,000 tons of bituminous coal and lignite and 21,000,000 tons of anthracite coal were produced. An estimated 2,447,000,000 barrels of crude petroleum, valued at \$7,400,000,000, were produced in 1958, a smaller output than in preceding years. About 5,543,000,000 gallons of natural gasoline were produced, and 11,015,000,000 cubic ft. of natural gas were marketed in 1958. Approximately 100,000,000 tons of iron ore are used in the U.S. every year, of which about 80 per

Pictures Courtesy Associated Amer. Artists Galleries, N. Y.

20th-CENTURY AMERICA THROUGH THE ARTIST'S EYE

Victor, Colorado. Painting by Adolf Dehn (*above*)

Storm Over Missouri River. Painting by John Steuart Curry (*below*)



Among the edible birds are the duck, goose, snipe, grouse, prairie chicken, quail, plover, pigeon, partridge, brant, wild turkey, and sandpiper. Other native birds are the hummingbird, lark, heron, crane, coot, ibis, gull, mockingbird, finch, sparrow, flamingo, pelican, crow, hawk, owl, swallow, buzzard, falcon, woodpecker, and vulture.

The alligator is found in the marshy regions of the Southeast, but it is becoming less numerous, being hunted for its skin. Lizards, tortoises, and turtles are common animals, and serpents are indigenous to all sections, but they vary greatly in size and number with latitude and climatic conditions. Poisonous snakes include the rattlesnake, the coral snake, the water moccasin, and the copperhead. Among the insects are houseflies, ants, several varieties of wasps and bees, termites, caterpillars, fleas, beetles, moths, grasshoppers and locusts, mosquitoes, and butterflies.

cent comes from the Lake Superior region in Michigan, Minnesota, and Wisconsin. Until recently, the U.S. was largely self-sufficient in most important minerals, but two wars, accelerating industrialization, and increasing population constituted a serious drain on supplies, and it now must import quantities of such minerals as copper, lead, and zinc, as well as bauxite, chromite, aluminum, manganese, tin, nickel, industrial diamonds, mica, and tungsten. New technology has created demands for such rare earths as germanium and tellurium. Uranium, a vital element in atomic-energy production, is being produced in greatly expanding amounts. In 1958 5,000,000 tons of ore, valued at \$114,000,000, and 14,000 tons of concentrate were produced. The producing states are Utah, New Mexico, Colorado, Wyoming, Arizona, Washington, South Dakota, Alaska, California, Nevada, and Montana. More than 800,000 men are employed in mining and mineral-processing industries. The value of all minerals and fuels produced in the U.S. in recent years is as follows: 1925, \$4,812,000,000; 1945, \$6,231,000,000; 1957, \$18,126,000,000; 1958, \$16,350,000,000.

AGRICULTURE. The U.S. is the leading country of the world in the output of farm products, including livestock. The extensive use of farm machinery has made it possible to increase greatly the area under cultivation. Much has been done by the government with this end in view. Many swampy districts have been drained, with the aid of the various states, or locally by counties, and both the national and state governments have expended large sums of money to irrigate lands which are naturally too dry for the germination and maturing of crops. Another factor has been the maintenance of schools of agriculture, which have greatly facilitated adapting the crops as well as methods of cultivation to the peculiarities of different localities. Such schools have been especially useful in promoting the cultivation of certain species of rice and cotton in the South, in promoting agriculture by *dry farming* in the arid regions, and in extending the corn belt farther north and west than it was formerly supposed that this cereal could be grown profitably. Much has been done to extend the cultivation of the sugar beet, to promote interest in cultivating Kaffir corn and macaroni wheat in the arid regions, and to obtain species of fruits adaptable to the different climatic conditions.

The total value of farm lands and buildings in 1957 was estimated at \$109,469,000,000, compared with \$75,255,000,000 in 1950, \$53,884,000,000 in 1945, \$33,636,000,000 in 1940, and \$47,873,000,000 in 1930. Farms averaged 242.2 acres in 1954, against 215.3 in 1950 and 156.6 in 1930. They ranged from 97.8 acres in the East South Central states of Kentucky, Tennessee, Alabama, and

Mississippi to 1,449 acres in the group of Mountain states running from Idaho and Montana in the north to Arizona and New Mexico in the south. In 1954 there were 4,782,393 farms, representing 60.8 per cent of the total land area, compared with *ca.* 5,859,000 farms in 1945 (59.9 per cent of the total land area) and 6,288,648 farms in 1930 (51.8 per cent of total land area). Nebraska in 1954 led all other states, with over 96.8 per cent of its total land area represented by farm land. In 1954, 57.2 per cent of U.S. farms were operated by full owners, compared with 56.3 per cent of the farms in 1945 and 47.1 per cent in 1935. The percentage of farms operated by tenants in 1950 ranged from a low of 3.7 for New England to a high of 36.6 for the East South Central section, where Mississippi led all other states with 51.6 per cent. Over the U.S., the percentage of farms operated by tenants declined from 42.1 in 1940 to 24.4 in 1954. The largest region of cultivated land is in the Mississippi Valley. Production is high on the Atlantic coast and on the Pacific slope. Truck gardening and fruit cultivation are distinctive features of farming in the East, sugar cane and cotton culture in the South, tobacco in the central Mississippi Valley, cereals and hay in the Northwest, and fruits and cereals on the Pacific slope. Sugar cane and pineapples are the main crops in Hawaii, and cereals and potatoes are grown in Alaska. Stock raising is an important enterprise in nearly all parts of the country, but the larger ranches are on the Great Plains, from the Gulf of Mexico to the Canadian border.

CEREALS. Corn is the leading cereal grown in the U.S., and the crop for the period 1951-57 averaged 3,334,000,000 bu. annually. Iowa, Illinois, Minnesota, Indiana, and Nebraska were the leading corn-producing states in 1957, in the order named. Oats came second in production and in the period 1951-57 averaged 1,260,000,000 bu. per year. Iowa is the highest-ranking producer of oats. The production of wheat averaged 1,010,000,000 bu. annually during 1951-57, with Kansas and North Dakota the leading producers of this crop. During the same seven-year period, potatoes, excluding sweet potatoes, averaged 232,234,000,000 lb. per year. Maine, Idaho, and California led in production. The barley production of the U.S. increased from a 1944-53 average of 266,918,000 bu. to 379,254,000 bu. in 1954, soaring to 435,695,000 bu. in 1957. California and North Dakota were principal sources of this crop, and Montana replaced Minnesota in third place. The national rice crop in 1957 was about 43,130,000 bags. Grain sorghums, soybeans, buckwheat, and rye are other important cereals. Soybean production increased from an average of 23,597,000 bu. yearly in 1931-35 to 479,841,000 bu. in 1957, reflecting the extended use of this crop as a basic

material for plastics, soaps, fabrics, varnishes, paints, and industrial and edible oils. During the war years, 1942-45, production of all cereals increased greatly over the previous output.

FRUITS. Fruit culture has developed rapidly, helped by the wide use of refrigerator cars, which make possible the safe transport of semitropical fruits to the northern sections. Apple production amounted to 100,623,000 bu. in 1956 and 117,308,000 bu. in 1957. Washington, New York, Virginia, and California contribute over half of the annual production. California alone furnishes half the annual peach production, which amounted to 63,058,000 bu. in 1957. California, Oregon, and Washington supplied over 90% of the 31,902,000 bu. of pears produced in 1957. Five states (California, Florida, Texas, Arizona, and Louisiana) produced an annual average of 136,636,000 boxes of oranges and tangerines in 1955-57, and California alone produced 14,700,000 boxes of lemons in 1957. Four states (Florida, Texas, Arizona, and California) maintained an average production of about 45,000,000 boxes of grapefruit in 1955-57. In 1957, 2,610,950 tons of grapes were grown, with all but about 220,000 tons coming from California. The output of pineapples in Hawaii amounted to 654,915 tons in 1949. Other important fruits are cherries, plums, prunes, figs, and apricots. The production of walnuts, averaging about 40,000 tons annually in 1930-34, averaged almost 74,000 tons annually in 1952-56. Pecan output increased from 53,000,000 lb. in 1929 to 173,700,000 lb. in 1956.

COTTON AND TOBACCO. The U.S. is the leading cotton-growing country of the world and has large tracts of land which are suitable for the cultivation of sea-island and other standard species. The cotton belt extends throughout the South, from Kentucky to the Gulf and from the Atlantic to the western part of Texas. During the seven-year period 1951-57, an annual average of 13,118,000 bales of 500 lb. each was produced. The yield in Texas is greater than that of any other state. Other large cotton-producing states are California, Mississippi, Arkansas, Arizona, Alabama, Tennessee, and Georgia. North Carolina leads in tobacco production, although this distinction was long maintained by Virginia and, later, by Kentucky. Besides the three states already mentioned, others producing large quantities of tobacco are Tennessee, South Carolina, Georgia, Pennsylvania, Maryland, and Florida. Over the period 1951-57, average annual production stood at 2,025,000,000 lb. In 1956 tobacco had a farm value of \$1,172,000,000, compared with \$333,000,000 for 1941, \$107,300,000 for 1932, and about \$250,000,000 annually for the period 1926-30. In 1957 the total tobacco production for the country was 1,680,108,000 lb.

OTHER CROPS. Hay is one of the leading prod-

ucts in all parts of the country. Among the chief species of grasses grown for hay are timothy, native grasses, clover, alfalfa, millet, and red top. Hay production in 1957 totaled 121,402,000 tons; in 1951-55 it averaged 108,941,000 tons. Flax is grown for seed in North and South Dakota, Minnesota, California, and Montana. Hops are cultivated in Washington, California, Oregon, and Idaho. Vegetables for the fresh market and for processing are grown in several areas, including the East, the irrigated Southwest, and the South. In 1956 the 28 grown for the fresh market totaled 10,810,550 tons; the 10 grown for processing totaled 8,259,500 tons. Other crops are sugar cane and beets, hemp, and potatoes and sweet potatoes.

LIVESTOCK. Cattle are the most numerous domestic animals, and they are raised both for meat and dairy purposes. Stock-raising is confined largely to the dry areas, where cattle, sheep, and horses are raised on large ranches. Texas stands first in the number of cattle, while Iowa and Illinois lead in the hog industry. Large dairy farms are found in Wisconsin, New York, Minnesota, Iowa, Pennsylvania, and Missouri. Kentucky and Texas are noted for their horses. Sheep are raised in all sections of the country, mostly Merino and Southdown breeds. Some leading sheep-raising states are Texas, Wyoming, California, Colorado, Montana, and Iowa. Other domestic animals include goats and poultry, especially chickens, turkeys, ducks, and geese. In 1957 farm animals were valued at \$8,715,177,000. Chickens and turkeys were valued at \$488,741,000 in 1957.

MANUFACTURES. The abundant natural resources—coal, iron, lumber, copper, petroleum, etc.; the extensive use of machinery; the large home market, unrestricted by tariffs or other trade barriers; and the extensive transportation system have all contributed to the growth of large-scale manufactures in the U.S. Before the Civil War, manufacturing enterprises were confined almost exclusively to the East, partly because the transportation facilities were not developed in the West and South. In recent years this situation has changed radically. Although the East still has a majority of the greater enterprises, large factories are found in towns and cities throughout the entire country. Georgia and Alabama have made remarkable strides in developing the cotton and iron industries, while North Carolina, South Carolina, and Georgia maintain a high place in the manufacture of cotton textiles. Developments along similar lines have been made in the West and the Northwest, especially in such cities as Chicago, St. Paul, Minneapolis, St. Louis, Denver, Seattle, San Francisco, and Los Angeles.

The leading manufactures in their order of

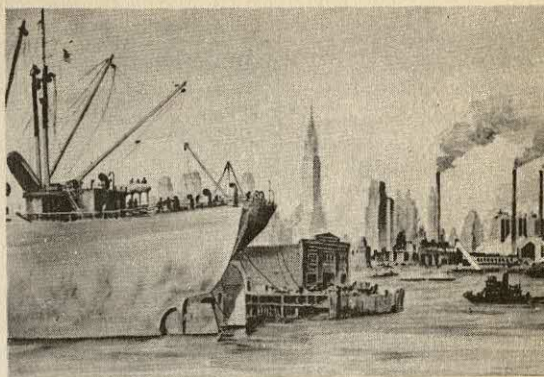
UNITED STATES

value in 1956 included transportation equipment, \$16,175,000,000; food and kindred products, \$15,374,000,000; machinery, exclusive of electrical machinery, \$14,968,000,000; primary metal industries, \$13,403,000,000; chemicals and allied products, \$11,592,000,000; fabricated metal products, \$8,934,000,000; electrical machinery, \$8,697,000,000; printing and publishing, \$7,400,000,000; apparel, \$5,807,000,000; paper, \$5,509,000,000; textiles, \$5,303,000,000; stone, clay, and glass products, \$4,883,000,000; lumber and products, except furniture, \$3,655,000,000; petroleum and coal products, \$3,098,000,000; instruments and related products, \$2,543,000,000; furniture and fixtures, \$2,453,000,000; rubber products, \$2,295,000,000; leather and leather products, \$1,850,000,000; tobacco manufactures, \$1,175,000,000; miscellaneous, \$4,570,000,000. The total value for 1956, \$139,683,000,000, is the value added by manufacture and is computed by subtracting the cost of materials and supplies from value of shipments.

Pennsylvania stands at the head of the iron and steel industry. Other states that rank high in this industry include Ohio, Indiana, Illinois, and Alabama, in the order named. The automobile industry is concentrated in the Detroit area. Akron is the leading tire producer in the U.S. Petroleum refining is centered near the large consuming areas. The manufacture of cotton goods, formerly centered in New England—Massachusetts has the largest annual output—has been shifting steadily to the South Atlantic states of Alabama, Georgia, North Carolina, and South Carolina. Woolens and carpets are made chiefly in Massachusetts, Pennsylvania, and Rhode Island, and silk textiles are produced in large quantities in Pennsylvania and New Jersey. New York City is the leading manufacturing center for both men's and women's clothing.

World War II brought about a tremendous increase in airplane production, with gigantic factories located throughout the Midwest and on the Pacific coast. Shipbuilding also underwent an enormous expansion. The end of the war, however, saw these industries shrinking, though their output remained considerably above prewar levels.

Postwar levels of industrial production by far exceeded prewar levels. Value added by manufacture amounted to \$24,000,000,000 in 1939, compared with \$74,000,000,000 in 1947 and \$139,700,000,000 in 1956. Manufacturing establishments, reporting an average employment of 7,808,000 production workers in 1939, had an average employment of 11,918,000 workers in 1947 and 13,135,000 in 1956. Reflecting this growth in the number of workers as well as rising wage levels, total wages paid to production workers increased from \$9,000,000,000 in 1939 to \$30,000,000,000 in



Courtesy Associated Amer. Artists Galleries, N. Y.

20th-CENTURY AMERICA THROUGH THE ARTIST'S EYE

New York Harbor. Painting by Adolf Dehn (*above*)
Cotton Pickers. Painting by Thomas Hart Benton (*below*)

Courtesy The Metropolitan Museum of Art, N. Y.



1947 and \$52,000,000,000 in 1956. The ten chief manufacturing states ranked as follows:

| STATE | 1956 | 1947 | 1939 |
|---------------|------|------|----------------|
| New York | 1 | 1 | 1 |
| Ohio | 2 | 4 | 4 |
| Pennsylvania | 3 | 2 | 2 |
| Illinois | 4 | 3 | 3 |
| California | 5 | 5 | 5 |
| Michigan | 6 | 7 | 8 |
| New Jersey | 7 | 6 | 6 |
| Indiana | 8 | 9 | 9 |
| Massachusetts | 9 | 8 | 7 |
| Wisconsin | 10 | 10 | — ¹ |

¹ Connecticut ranked 10th.

Slaughtering and meat-packing are centered largely in the Midwest; Chicago is unsurpassed by any other city in the world in this industry. Other cities that rank high are Kansas City, Omaha, St. Louis, and St. Joseph. About five-sixths of slaughterhouse products are sold fresh, after being brought to market in refrigerator cars.

Lumber and lumber products are produced in various sections of the country, especially in Oregon, California, Washington, and North Carolina. The production of paper and paper products is important in New York, Pennsylvania, Wisconsin, and Ohio. The leather industry is a major enterprise in Massachusetts, New York, Missouri, and Pennsylvania.

The U.S. produces large quantities of clocks, needles, pins, musical instruments, and hardware. In printing and publishing it ranks high, especially in the output of daily newspapers, magazines, and books. Total receipts in the newspaper industry were \$2,926,000,000 in 1954, \$1,792,000,000 in 1947, and \$846,000,000 in 1939. Magazine receipts were \$1,413,000,000 in 1954, \$1,046,000,000 in 1947, and \$409,000,000 in 1939. New York and Chicago are the leading publishing centers. Industries producing chemicals and chemical products (such as dyes, fertilizers, fabrics, etc.) and electronics equipment have gained in importance. Some general manufactures are pottery, tile, glass, brick, tobacco products, rubber goods, sugar, and dried fish and fruits.

FOREIGN COMMERCE. Merchandise exports in 1957 totaled \$20,810,000,000, compared with \$3,177,000,000 in 1939. Grouped by commodities, the 1957 exports included: machinery and vehicles, \$6,990,000,000; metals and manufactures, except machinery and vehicles, \$2,394,000,000; nonmetallic minerals, \$2,156,000,000; textiles, \$1,744,000,000; chemicals and related products, \$1,395,000,000; vegetable food products and beverages, \$1,952,000,000; inedible vegetable products, \$1,196,000,000; animals and animal products, \$671,000,000; wood and paper, \$482,000,000; miscellaneous items, \$1,653,000,000.

Imports for 1957 totaled \$12,978,000,000, compared with \$2,318,000,000 in 1939. The value of imports in 1957 was divided as follows: vegetable food products and beverages, \$2,750,000,000; metals and manufactures, except machinery and vehicles, \$2,334,000,000; nonmetallic minerals, \$2,101,000,000; wood and paper, \$1,466,000,000; textiles, \$982,000,000; machinery and vehicles, \$858,000,000; inedible vegetable products, \$734,000,000; animals and animal products, \$842,000,000; chemicals and related products, \$276,000,000; miscellaneous items, \$579,000,000. See also *Customs Duties*.

TRANSPORTATION AND COMMUNICATION. The transportation facilities of the U.S. surpass those of any of the other leading nations of the world. Besides its 24,500 m. of navigable rivers and interior and coastal waters, the country has the most extensive network of railroads in the world. Numerous canals facilitate water transportation. The canals utilized most extensively are the Welland Canal (Canadian), by-passing Niagara

Falls; the New York State Barge Canal, connecting the Hudson River and Lake Erie; the Chicago Sanitary and Ship Canal, extending from Lake Michigan at Chicago; the St. Mary's Canal, at Sault Ste. Marie, Mich.; and the Miami Canal, in Ohio (see also *Saint Lawrence Seaway and Power Project*). At present, the railroad lines extend for about 221,000 m.; in 1957 they carried 411,200,000 passengers. Intercity motorbus lines handled about 516,000,000 passengers in 1957, against 1,092,000,000 in 1945. The number of passengers carried by airlines increased from 572,000 in 1934 to 7,052,000 in 1945 and 52,712,000 in 1957. Communication by telephone and telegraph is general throughout the country, and telephones are used extensively even in sparsely settled districts. On Dec. 31, 1957, there were 63,621,000 telephones in use, an increase of more than 20,000,000 over 1950 and more than 41,000,000 over 1940. The Western Union Telegraph Co., which virtually monopolized the field, reported 1,116,000 m. of wire in 1957. Express lines are operated generally in connection with railroads and steamships. The postal service is federally managed.

The highways of the U.S. are at present maintained by the townships, municipalities, counties, and states. State highway departments, with the aid of Federal funds, maintain certain roads in cooperation with the Bureau of Public Roads of the Dept. of Commerce. The roads of the Federal-aid system are designated as numbered U.S. routes and are also known by a variety of popular names, such as the Lincoln Highway, the Dixie Highway, etc. The Lincoln Highway extends 3,384 m. from New York City to San Francisco, via Chicago, Omaha, and Cheyenne.

In 1957 there were 3,429,801 m. of roads and highways in the U.S., including 1,066,062 m. which were nonsurfaced. Disbursements by the states for highway purposes, including the payment of principal and interest on highway bonds, in 1956 were almost \$7,000,000,000, of which approximately 50 per cent was spent on construction and an additional 11 per cent on maintenance.

POPULATION. Between 1820 and 1957, a total of 41,061,612 immigrants from all parts of the world entered the U.S. Of this number, the largest single group, 6,635,305, came from Germany. Italy sent 4,909,087 of her people and Ireland, 4,653,760. Austria-Hungary took fourth place with 4,236,962, including many Poles and Slovaks. Great Britain, comprising England, Scotland, and Wales, sent 3,722,126 nationals to the U.S. Russian immigrants numbered 3,344,097. Canadian immigrants totaled 3,428,988. Danes, Swedes, and Norwegians contributed 2,421,418 persons to the American immigration rolls. In addition, there were 1,056,247 Mexicans, 667,987 French, 476,210

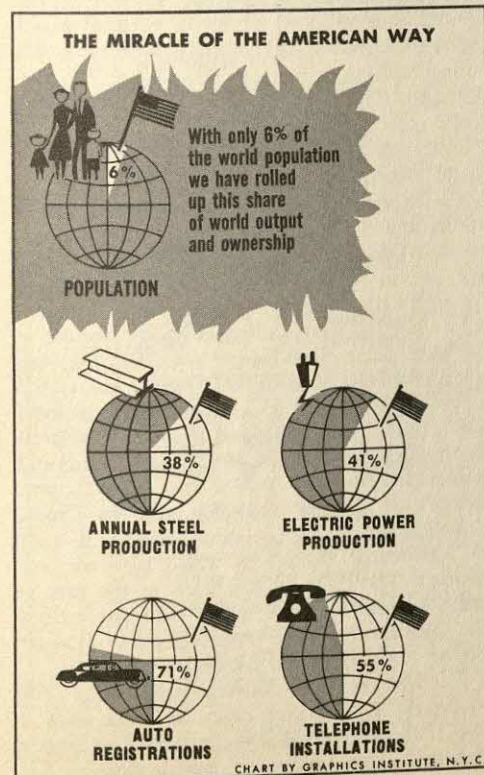
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Greeks, and 423,825 Poles.¹ At the time of the first census, in 1790, the center of population was 23 m. E. of Baltimore, Md. In 1960 the center was in Illinois, 57 m. to the west of the 1950 site in that state. While this reflected the constant westward movement of the population, 18 m. of the 1960 westward shift was attributable to the addition of Alaska and Hawaii. See *Census; Immigration; Population; Population, Center of*.

| YEAR | POPULATION | URBAN | % URBAN |
|------|-------------|-------------|---------|
| 1790 | 3,929,214 | 201,655 | 5.1 |
| 1800 | 5,308,483 | 322,371 | 6.1 |
| 1810 | 7,239,881 | 525,459 | 7.3 |
| 1820 | 9,638,453 | 693,255 | 7.2 |
| 1830 | 12,866,020 | 1,127,247 | 8.8 |
| 1840 | 17,069,453 | 1,845,055 | 10.8 |
| 1850 | 23,191,876 | 3,543,716 | 15.3 |
| 1860 | 31,443,321 | 6,216,518 | 19.8 |
| 1870 | 38,558,371 | 9,902,361 | 25.7 |
| 1880 | 50,155,783 | 14,129,735 | 28.2 |
| 1890 | 62,947,714 | 22,106,265 | 35.1 |
| 1900 | 75,994,575 | 30,159,921 | 39.7 |
| 1910 | 91,972,266 | 41,998,932 | 45.7 |
| 1920 | 105,710,620 | 54,157,973 | 51.2 |
| 1930 | 122,775,046 | 68,954,823 | 56.2 |
| 1940 | 131,669,275 | 74,423,702 | 56.5 |
| 1950 | 150,697,361 | 96,028,000 | 63.7 |
| 1960 | 183,285,009 | 125,268,750 | 69.9 |

The 1960 census (April) gave the population

¹ From 1899 to 1919 Poland is included with Austria-Hungary, Germany, and Russia.



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of the mid-continental (or conterminous; *i.e.*, excluding Alaska and Hawaii) U.S. as 178,464,236, or 60.1 persons per sq. m. of land area, an increase over 1950 of 27,766,875, or 18.4 per cent. The District of Columbia and three states—West Virginia, Arkansas, and Mississippi—showed decreases in the decade 1950-60.

According to the current definition of urban and rural areas, in 1960 the urban population of the conterminous U.S. was 124,699,022, compared with 96,467,686 in 1950, an increase of 29.3 per cent. The rural population was 53,765,214, compared with 54,229,675 in 1950, a decrease of .9 of 1 per cent. The following table lists the chief cities and their population in 1960:

| CITY | POP. | CITY | POP. |
|------------------|-----------|---------------|---------|
| New York | 7,781,984 | Oakland | 367,548 |
| Chicago | 3,550,404 | Ft. Worth | 356,268 |
| Los Angeles | 2,479,015 | Long Beach | 344,168 |
| Philadelphia | 2,002,512 | Birmingham | 340,887 |
| Detroit | 1,670,144 | Oklahoma City | 324,253 |
| Baltimore | 939,024 | Rochester | 318,611 |
| Houston | 938,219 | Toledo | 318,003 |
| Cleveland | 876,050 | St. Paul | 313,411 |
| Washington | 763,956 | Norfolk | 304,869 |
| St. Louis | 750,026 | Omaha | 301,598 |
| Milwaukee | 741,324 | Honolulu | 294,194 |
| San Francisco | 740,316 | Miami | 291,688 |
| Boston | 697,197 | Akron | 290,351 |
| Dallas | 679,684 | El Paso | 276,687 |
| New Orleans | 627,525 | Jersey City | 276,101 |
| Pittsburgh | 604,332 | Tampa | 274,970 |
| San Antonio | 587,718 | Dayton | 262,332 |
| San Diego | 573,224 | Tulsa | 261,685 |
| Seattle | 557,087 | Wichita | 254,698 |
| Buffalo | 532,759 | Richmond | 219,958 |
| Cincinnati | 502,550 | Syracuse | 216,038 |
| Memphis | 497,524 | Tucson | 212,892 |
| Denver | 493,887 | Des Moines | 208,982 |
| Atlanta | 487,455 | Providence | 207,498 |
| Minneapolis | 482,872 | San Jose | 204,196 |
| Indianapolis | 476,258 | Mobile | 202,779 |
| Kansas City, Mo. | 475,539 | Charlotte | 201,564 |
| Columbus, O. | 471,316 | Albuquerque | 201,189 |
| Phoenix | 439,170 | Jacksonville | 201,030 |
| Newark | 405,220 | Flint | 196,940 |
| Louisville | 390,639 | Sacramento | 191,667 |
| Portland, Ore. | 372,676 | Yonkers | 190,634 |

RELIGION. Free exercise of religious belief is guaranteed both by the Constitution and the individual states. Church membership in 1960 totaled 114,449,217, according to official reports from U.S. religious bodies. Of this total, 63,668,835 belonged to Protestant churches; 42,104,900 were Roman Catholics; 5,367,000 were Jewish; and the remaining 3,308,482 belonged to various groups such as the Orthodox churches, the Buddhists, and the Polish National Catholics. According to the 1936 census of religion there were 55,800,000 church members, of whom 19,914,937 were Roman Catholics and 4,641,000 were Jewish. The following table gives the membership of the major Protestant bodies, according to official reports from the groups themselves (for the year

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1960), compared with the membership recorded in the 1936 religion census.

| CHURCH | 1936 | 1960 |
|--|-----------|------------|
| Baptist ¹ | 8,262,287 | 21,148,862 |
| Methodist ¹ | 7,001,637 | 12,424,623 |
| Lutheran ¹ | 4,244,890 | 8,080,867 |
| Presbyterian ¹ | 2,532,010 | 4,333,249 |
| Protestant Episcopal | 1,735,335 | 3,444,265 |
| Christian Churches (Disciples of Christ) ² | 1,196,315 | 1,801,821 |
| Congregational Christian | 976,388 | 1,427,863 |
| Latter Day Saints ¹ | 774,169 | 1,647,546 |
| Evangelical and Reformed | 645,353 | 813,271 |
| Evangelical-United Brethren ³ | 605,343 | 748,216 |
| Churches of Christ | 309,551 | 2,163,493 |
| Reformed Bodies ⁴ | 299,694 | 468,520 |
| Seventh-Day Adventists | 165,815 | 317,852 |
| Church of the Nazarene | 136,227 | 307,629 |
| Church of the Brethren | 128,392 | 199,947 |
| Societies of Friends (Quakers) ¹ | 93,697 | 126,199 |

¹ Total includes figures for separate religious bodies within the denomination.

² Denomination renamed Christian Churches (Disciples of Christ), International Convention.

³ Separate churches until 1946; combined total of both churches given for 1936.

⁴ Christian Reformed and Reformed Church in America.

LANGUAGE. English is the national language and is spoken by most of the people. Among the leading languages spoken aside from the English are German, French, Italian, Spanish, Polish, Slovak, and Yiddish. Contributing to the use of one language is the fact that no large region is populated exclusively by a single race, but instead all races are quite generally distributed or are freely intermixed. People of British and German descent are found in all sections of the country, while the Scandinavians are confined largely to the northwest, the Spanish to the southwest, the French to Louisiana and some eastern sections, and the Greeks and Italians to the manufacturing and industrial centers. The English spoken differs in accent very noticeably from that of England and is somewhat characterized by local peculiarities, as for example, the distinguishing form of expressions heard in New England and in the South. However, printed English and the language as taught in the schools are uniform. See also *Americanisms*; *English*; *Language*.

LITERATURE. See *American Literature*.

EDUCATION. The educational system of the U.S. is largely under the direction of the states. Each state has a system of public elementary and high schools. The state institutions of higher learning are maintained by taxation and appropriations under the laws of the respective states. In 1950, according to the census of that year, 6 per cent of the total population 25 years of age and over were college graduates, and 20.2 per cent were

high-school graduates. The elementary schools have courses in basic studies from the kindergarten to the high school, while the high schools are designed to prepare students for the higher institutions or for business careers. A superintendent of public instruction or a commissioner of education, assisted by county and city superintendents, has general supervision of the educational affairs of the state. Local control often rests with local school boards. In each state, there are a number of private denominational and sectarian colleges and, in many of them, universities, supported either wholly or in part by endowments. The national government has appropriated funds for the establishment of universities, industrial schools, and institutions to teach agriculture and the mechanical arts. Under the direct supervision of the national government are academies for training officers of the armed forces and the merchant marine. See *Naval Academy*; *West Point*.

The U.S. Dept. of Health, Education, and Welfare, through its Office of Education, collects educational statistics, provides information on school administration and teaching methods, administers Federal funds appropriated to aid education, and serves in an advisory capacity. Public schools are free to all. A limited compulsory attendance law is on all state statute books, requiring attendance, in most (33) states, from the ages of seven to 16 years. For the status of school segregation, following the 1954 Supreme Court ruling banning segregated schools, see *Negroes*. See also *Education*; *Schools*; *Universities and Colleges*.

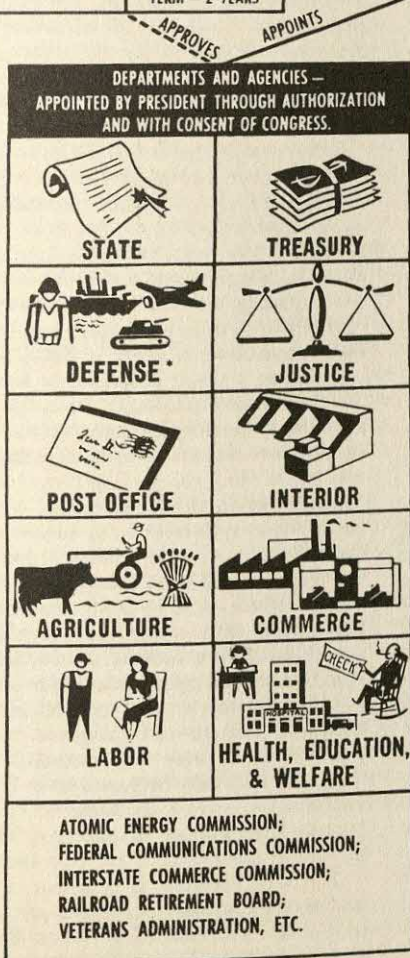
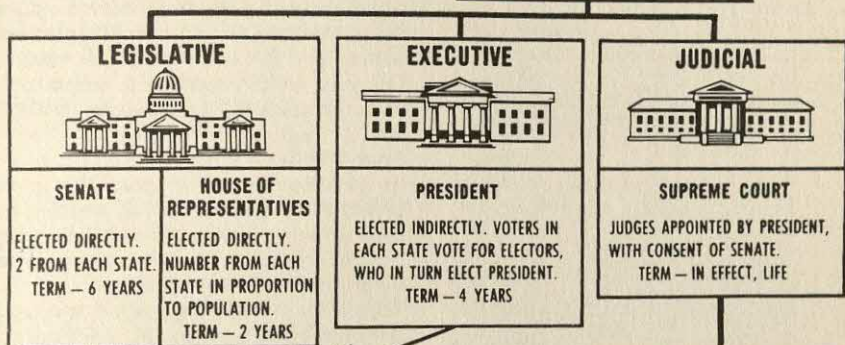
POLITICAL DIVISIONS. The U.S. proper consists of 50 states and the District of Columbia. All but one state (Hawaii) are located in North America, and of the remaining 49, only Alaska is noncontiguous. Many of the state boundary lines are formed by rivers, lakes, and other natural lines of demarcation. For this reason, they are somewhat irregular, only four states meeting at the same point, these being Colorado, Utah, Arizona, and New Mexico. Each state is guaranteed a republican form of government by the national Constitution and is limited in various respects by that fundamental law as to general rights and powers. A complete list of the states follows, with dates of their admission into the Union, their capitals, their populations, and the number of Presidential electors to which they are now entitled. The dates of admission of the first 13 states are the dates on which each one ratified the Constitution. (For areas and other data, see the separate articles on each state.)

The District of Columbia is governed by Congress; the District's residents have no voice in the administration. They may, however, choose Presidential electors in national elections.

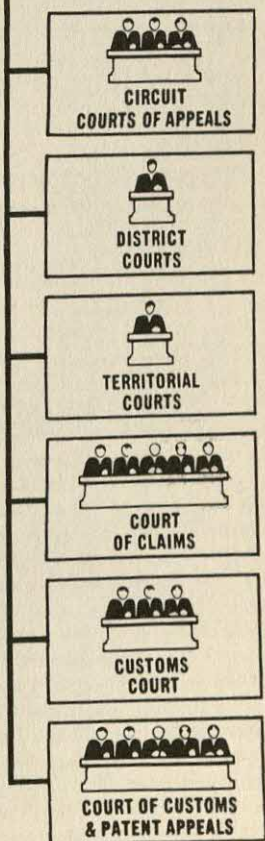
OUR GOVERNMENT

CONSTITUTION

SPECIFIES BRANCHES & POWERS OF
FEDERAL GOVERNMENT.
INCLUDES SPECIFIC
POWERS GRANTED CONGRESS, THOSE
DENIED THE UNITED STATES AND EACH
STATE. INCLUDES AMENDMENTS.
1-10 ARE KNOWN AS
THE "BILL OF RIGHTS."



THESE LOWER COURTS ESTABLISHED
BY ACTS OF CONGRESS, AS
SPECIFIED IN THE CONSTITUTION.



*INCLUDES THE ARMY, NAVY, AIR FORCE

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The territories of the U.S. vary in status. Guam and the Virgin Islands are organized territories, with organic acts, passed by the U.S. Congress, which parallel state constitutions. They have governors appointed by the President and elect their legislatures. However, they are not

from such territorial possessions of the U.S. The states and the surveyed portions of territories are divided into counties, usually made up of 16 townships of 36 sections (640 acres each).

GOVERNMENT. The government of the U.S. is administered through three distinct and separate branches. These are the legislative, or lawmaking division; the executive, or law-enforcing division; and the judicial, or law-interpreting division. The legislative branch is vested in the Congress, which consists of a Senate and House of Representatives; the executive, in a President; and the judicial, in the Federal courts of law. From 1777 until 1789, the U.S. was governed by the Articles of Confederation. This government proved to be unsatisfactory in meeting the problems of the newly formed and developing country, and the present Constitution was written by a constitutional convention that met in Philadelphia, Pa., on May 25, 1787. It was adopted by the convention on Sept. 17, 1787, and the first government under the Constitution began to function on March 4, 1789. Since then, 22 amendments have been made in the Constitution.

An official motto, "In God We Trust," was adopted by the Senate in 1956.

EXECUTIVE DEPARTMENT. The President is the chief executive, and he is succeeded by the Vice President in case of death, resignation, or removal after impeachment. Both are elected for a term of four years by the people through an electoral college, composed of electors from each state equaling the number of Senators and Representatives sent by the state to Congress. The President receives a salary of \$100,000 per year, and also an expense allowance of \$90,000. Until the election of Franklin D. Roosevelt to a third and fourth Presidential term, it was traditional that no President should hold office for more than two terms. With the passage (1951) of the 22nd Amendment to the Constitution, this tradition became law, applicable to all successors of President Truman. The President's general duties are to execute the laws. Though he is commander in chief of the U.S., he is not the active head of the armed services. He may conclude treaties by and with the consent of the Senate, make nominations and appointments for public offices, inform Congress of the state of the Union by messages, and convoke Congress in special session. While he may veto measures enacted by Congress, bills may be passed over his veto by a two-thirds vote in each house of Congress and become laws without his sanction. The wartime powers of the President are very extensive.

The Vice President is president of the Senate and receives a salary of \$35,000 per year as well as a taxable expense allowance of \$10,000. Both the President and Vice President are eligible to office under the same conditions; namely, that

| NAME AND REGION | DATE OF RATIFICATION OR ADMISSION | CAPITAL | POPULATION, 1950 | ELECTORS (531) |
|-----------------|-----------------------------------|----------------|------------------|----------------|
| Ala. (5)... | Dec. 14, 1819 | Montgomery | 3,061,743 | 11 |
| Alaska... | Jan. 3, 1959 | Juneau | 128,643 | 3 |
| Ariz. (8)... | Feb. 14, 1912 | Phoenix | 749,587 | 4 |
| Ark. (7)... | June 15, 1836 | Little Rock | 1,009,511 | 8 |
| Calif. (6)... | Sept. 9, 1850 | Sacramento | 10,586,223 | 32 |
| Colo. (8)... | Aug. 1, 1876 | Denver | 1,325,089 | 6 |
| Conn. (1)... | Jan. 9, 1788 | Hartford | 2,007,280 | 8 |
| Del. (5)... | Dec. 7, 1787 | Dover | 318,085 | 3 |
| Fla. (5)... | Mar. 3, 1845 | Tallahassee | 2,771,305 | 10 |
| Ga. (5)... | Jan. 2, 1788 | Atlanta | 3,444,578 | 12 |
| Hawaii... | Aug. 21, 1959 | Honolulu | 499,794 | 3 |
| Idaho (3)... | July 3, 1890 | Boise | 588,037 | 4 |
| Ill. (3)... | Dec. 3, 1818 | Springfield | 8,712,176 | 27 |
| Ind. (3)... | Dec. 11, 1816 | Indianapolis | 1,325,089 | 13 |
| Iowa (4)... | Dec. 28, 1846 | Des Moines | 2,021,073 | 10 |
| Kan. (4)... | Jan. 29, 1861 | Topeka | 1,005,209 | 8 |
| Ky. (6)... | June 1, 1792 | Frankfort | 2,044,806 | 10 |
| La. (7)... | Apr. 30, 1812 | Baton Rouge | 2,083,516 | 10 |
| Maine (1)... | Mar. 15, 1820 | Augusta | 913,774 | 5 |
| Md. (5)... | Apr. 28, 1788 | Annapolis | 2,343,001 | 9 |
| Mass. (1)... | Feb. 6, 1788 | Boston | 4,090,514 | 16 |
| Mich. (3)... | Jan. 26, 1837 | Lansing | 6,371,766 | 20 |
| Minn. (4)... | May 11, 1858 | St. Paul | 2,082,483 | 11 |
| Miss. (6)... | Dec. 10, 1817 | Jackson | 2,178,014 | 8 |
| Mo. (4)... | Aug. 10, 1821 | Jefferson City | 3,054,053 | 13 |
| Mont. (8)... | Nov. 8, 1889 | Helena | 501,024 | 4 |
| Nebr. (4)... | Mar. 1, 1867 | Lincoln | 1,325,010 | 6 |
| Nev. (8)... | Oct. 31, 1864 | Carson City | 160,083 | 3 |
| N. H. (1)... | June 21, 1788 | Concord | 533,242 | 4 |
| N. J. (2)... | Dec. 18, 1787 | Trenton | 4,835,320 | 16 |
| N. M. (8)... | Jan. 6, 1912 | Santa Fe | 681,187 | 4 |
| N. Y. (2)... | July 26, 1788 | Albany | 14,830,192 | 45 |
| N. C. (5)... | Nov. 21, 1789 | Raleigh | 4,061,020 | 14 |
| N. D. (4)... | Nov. 2, 1889 | Bismarck | 619,036 | 4 |
| Ohio (3)... | Feb. 19, 1803 | Columbus | 7,040,627 | 25 |
| Okla. (7)... | Nov. 16, 1907 | Oklahoma City | 2,233,351 | 8 |
| Ore. (6)... | Feb. 14, 1859 | Salem | 1,521,341 | 6 |
| Pa. (2)... | Dec. 12, 1787 | Harrisburg | 10,498,012 | 32 |
| R. I. (1)... | May 29, 1790 | Providence | 701,896 | 4 |
| S. C. (5)... | May 23, 1788 | Columbia | 2,117,027 | 8 |
| S. D. (4)... | Nov. 2, 1889 | Pierre | 652,740 | 4 |
| Tenn. (6)... | June 1, 1796 | Nashville | 3,201,718 | 11 |
| Texas (7)... | Dec. 29, 1845 | Austin | 7,711,194 | 24 |
| Utah (8)... | Jan. 4, 1896 | Salt Lake City | 688,862 | 4 |
| Vt. (1)... | Mar. 4, 1791 | Montpelier | 377,747 | 3 |
| Va. (5)... | June 25, 1788 | Richmond | 3,318,680 | 12 |
| Wash. (6)... | Nov. 11, 1889 | Olympia | 3,378,063 | 0 |
| W. Va. (5)... | June 19, 1863 | Charleston | 2,005,552 | 8 |
| Wis. (3)... | May 29, 1848 | Madison | 3,434,575 | 12 |
| Wyo. (8)... | July 10, 1890 | Cheyenne | 299,529 | 3 |

(1) New England state; (2) Middle Atlantic state; (3) East North Central state; (4) West North Central state; (5) South Atlantic state; (6) East South Central state; (7) West South Central state; (8) Mountain state; (9) Pacific state.

incorporated as were Alaska and Hawaii before becoming states (*i.e.*, the U.S. Constitution does not apply to them as to a state). American Samoa is unorganized and unincorporated. Puerto Rico is a self-governing commonwealth; it elects its governor and legislature but maintains connections with the U.S. through the Puerto Rican Federal Relations Act. It is represented in Congress by a resident commissioner. The Canal Zone is governed by the Panama Canal Co. and an appointed governor. The Trusteeship System of the U.N. allotted the Trust Territory of the Pacific Islands to the U.S., which governs through a high commissioner. The Dept. of the Interior exercises some supervision in all territories. Congress has the power to admit new states formed

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they must be born within the jurisdiction of the U.S., have attained the age of 35 years, and have resided at least 14 years within the U.S. In case both the President and Vice President die or are removed by conviction on impeachment, succession goes to the Speaker of the House of Representatives. In case the latter cannot qualify, succession devolves upon (1) the president *pro tempore* of the Senate and (2) upon the cabinet, beginning with the Secretary of State, followed by the Secretary of the Treasury, etc.

The Presidents and Vice Presidents are listed in the accompanying tables.

The President is assisted in the discharge of his duties by ten cabinet officers, who are the heads of the different departments of the government. These are the Secretary of State, of the Treasury, of the Interior, of Agriculture, of Commerce, of Labor, the Postmaster General, the Attorney General, the Secretary of Defense, and the Secretary of Health, Education, and Welfare. The Secretaries of the Army, Navy, and Air Force have no cabinet rank. Cabinet officers' duties are to advise the President and to report to him concerning their respective departments. The salary of cabinet officers is \$25,000 per year and the term of office is at the pleasure of the President, who appoints them subject to approval by the Senate. See also *United States: CONSTITUTION OF THE; United States: DEPARTMENTS OF.*

LEGISLATIVE DEPARTMENTS. The Senate comprises two Senators from each state, elected by popular vote for a period of six years, the terms of one-third of the members expiring every two years. Members of the House of Representatives are chosen by popular vote for terms of two years, the entire membership being elected at the same time every second year. The Senate consists of 100 members and the House of 435¹ members. See *Congress*.

JUDICIAL DEPARTMENT. The judicial department of the national government is vested in a Supreme Court, composed of a chief justice and eight associate justices; in the circuit courts of appeal, and the district courts. The Chief Justice of the U.S. receives \$35,500 per year, while the Associate Justices of the Supreme Court receive \$35,000. Congress has power to establish and organize all the courts except the Supreme Court, which is established by the Constitution. The judges of these courts are nominated by the President subject to confirmation by the Senate.

STATE GOVERNMENTS. For a description of the state governments, see separate state articles.

DEFENSE. See *Air Force; Army; Coast Guard;*

Marine Corps; Navy; United States: DEPARTMENTS OF.

| PRESIDENTS | ELECTED FROM | PARTY ¹ | DATE OF FIRST OR ONLY INAUGURATION |
|------------------------------|--------------|-----------------------|------------------------------------|
| 1. George Washington... | Va. | Federalist | Apr. 30, 1789 |
| 2. John Adams... | Mass. | Federalist | Mar. 4, 1797 |
| 3. Thomas Jefferson... | Va. | Democrat | Mar. 4, 1801 |
| 4. James Madison... | Va. | Republican | Mar. 4, 1809 |
| 5. James Monroe... | Va. | Republican | Mar. 4, 1817 |
| 6. John Quincy Adams... | Mass. | (National-Republican) | Mar. 4, 1825 |
| 7. Andrew Jackson... | Tenn. | Democrat | Mar. 4, 1829 |
| 8. Martin Van Buren... | N. Y. | Democrat | Mar. 4, 1837 |
| 9. Wm. H. Harrison... | Ohio | Whig | Mar. 4, 1841 |
| 10. John Tyler... | Va. | Whig | Apr. 6, 1841 |
| 11. James K. Polk... | Tenn. | Democrat | Mar. 4, 1845 |
| 12. Zachary Taylor... | La. | Whig | July 5, 1849 |
| 13. Millard Fillmore... | N. Y. | Whig | Mar. 9, 1850 |
| 14. Franklin Pierce... | N. H. | Democrat | Mar. 4, 1853 |
| 15. James Buchanan... | Pa. | Democrat | Mar. 4, 1857 |
| 16. Abraham Lincoln... | Ill. | Republican | Mar. 4, 1861 |
| 17. Andrew Johnson... | Tenn. | Democrat | Apr. 15, 1865 |
| 18. Ulysses S. Grant... | Ill. | Republican | Mar. 4, 1869 |
| 19. Rutherford B. Hayes... | Ohio | Republican | Mar. 5, 1877 |
| 20. James A. Garfield... | Ohio | Republican | Mar. 4, 1881 |
| 21. Chester A. Arthur... | N. Y. | Republican | Sept. 20, 1881 |
| 22. Grover Cleveland... | N. Y. | Democrat | Mar. 4, 1885 |
| 23. Benjamin Harrison... | Ind. | Republican | Mar. 4, 1889 |
| 24. Grover Cleveland... | N. Y. | Democrat | Mar. 4, 1893 |
| 25. William McKinley... | Ohio | Republican | Sept. 14, 1897 |
| 26. Theodore Roosevelt... | N. Y. | Republican | Mar. 4, 1901 |
| 27. William H. Taft... | N. Y. | Republican | Mar. 4, 1909 |
| 28. Woodrow Wilson... | Ohio | Democrat | Mar. 4, 1913 |
| 29. Warren G. Harding... | Ohio | Republican | Mar. 4, 1921 |
| 30. Calvin Coolidge... | Vt. | Republican | Aug. 2, 1923 |
| 31. Herbert C. Hoover... | Calif. | Republican | Mar. 4, 1929 |
| 32. Franklin D. Roosevelt... | N. Y. | Democrat | Mar. 4, 1933 |
| 33. Harry S. Truman... | Mo. | Democrat | Apr. 12, 1945 |
| 34. Dwight D. Eisenhower... | Kans. | Republican | Jan. 20, 1953 |
| 35. John F. Kennedy... | Mass. | Democrat | Jan. 20, 1961 |
| 36. Lyndon B. Johnson... | Texas | Democrat | Nov. 22, 1963 |

¹ See Political Parties.

² Died in office.

| VICE PRESIDENTS | BORN | DIED | ELECTED FROM | PRESIDENT |
|-------------------------------------|------|------|--------------|-----------------------|
| John Adams ¹ ... | 1735 | 1826 | Mass. | Washington |
| Thomas Jefferson... | 1743 | 1826 | Va. | John Adams |
| Aaron Burr... | 1756 | 1836 | N. Y. | Jefferson |
| George Clinton... | 1739 | 1812 | N. Y. | Jefferson and Madison |
| Elbridge Gerry... | 1744 | 1814 | Mass. | Madison |
| Daniel D. Tompkins... | 1774 | 1825 | N. Y. | Monroe |
| Jan C. Calhoun... | 1782 | 1850 | S. C. | J. Q. Adams |
| Martin Van Buren ¹ ... | 1782 | 1862 | N. Y. | Monroe |
| Richard M. Johnson... | 1780 | 1850 | Ky. | J. Q. Adams |
| John Tyler ² ... | 1790 | 1862 | Va. | Van Buren |
| George M. Dallas... | 1792 | 1864 | Penn. | Harrison |
| Millard Fillmore ² ... | 1800 | 1874 | N. Y. | Polk |
| William R. King... | 1786 | 1853 | Ala. | Taylor |
| John C. Breckinridge... | 1821 | 1875 | Ky. | Pierce |
| Hannibal Hamlin... | 1809 | 1891 | Me. | Buchanan |
| Andrew Johnson ² ... | 1808 | 1875 | Tenn. | Lincoln |
| Schuyler Colfax... | 1823 | 1885 | Ind. | Lincoln |
| Henry Wilson... | 1812 | 1875 | Mass. | Grant |
| William A. Wheeler... | 1819 | 1887 | N. Y. | Grant |
| Chester A. Arthur ² ... | 1830 | 1886 | N. Y. | Hayes |
| Thomas A. Hendricks... | 1819 | 1885 | Ind. | Garfield |
| Levi P. Morton... | 1824 | 1920 | N. Y. | Cleveland |
| Adlai E. Stevenson... | 1835 | 1914 | Ill. | Harrison |
| Garrett A. Hobart... | 1844 | 1899 | N. J. | Cleveland |
| Theodore Roosevelt ² ... | 1858 | 1919 | N. Y. | McKinley |
| Charles W. Fairbanks... | 1852 | 1918 | Ind. | McKinley |
| James S. Sherman... | 1855 | 1912 | N. Y. | T. Roosevelt |
| Thomas R. Marshall... | 1854 | 1925 | Ind. | Wilson |
| Calvin Coolidge ² ... | 1872 | 1933 | Vt. | Harding |
| Charles G. Dawes... | 1865 | 1951 | Ill. | Coolidge |
| Charles Curtis... | 1860 | 1936 | Kans. | Hoover |
| John N. Garner... | 1868 | | Texas | F. Roosevelt |
| Henry A. Wallace... | 1888 | | Iowa | F. Roosevelt |
| Harry S. Truman ² ... | 1884 | | Mo. | F. Roosevelt |
| Alben W. Barkley... | 1877 | 1956 | Ky. | Truman |
| Richard M. Nixon... | 1913 | | Calif. | Eisenhower |
| Lyndon B. Johnson ² ... | 1908 | | Texas | Kennedy |

¹ With the addition of one Representative from Alaska and one from Hawaii, House members total 437 until reapportionment takes place after the 1960 census, when the number returns to 435.

² Later elected President. ³ Succeeded to the Presidency on the death of the President. ⁴ Succeeded to the Presidency on the death of the President and was later elected to the office.

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HISTORY. The history of the U.S. in a broad sense dates from the discovery of America by Christopher Columbus, who set foot upon land in the New World on Oct. 12, 1492. However, it is reasonable to assume that earlier discoveries were made by Norsemen. Eric the Red, a Norseman, is thought to have discovered Greenland in 985. Leif Ericsson, son of Eric the Red, sailed from Norway to Iceland in 1000 and the following year probably came to the northeastern coast of North America, but little accurate knowledge about these explorations and discoveries is available. It is therefore usually considered that American history dates from 1492, though Columbus did not visit the mainland of North America. John Cabot, a Venetian in English service, sailed along the northeastern coast of North America in 1498, exploring it from Virginia to Labrador. Waldseemüller, a cartographer and scholar, gave the name "America" to the new continent in 1507, in honor of Amerigo Vespucci (*q.v.*), who was thought to have reached the American Continent in 1497-98, before Columbus or Cabot. There is doubt that Vespucci made the 1497 voyage, and if he reached the American Continent at all, it was either in 1499 or 1501. De Soto explored the Gulf of Mexico area (1540-43) and Coronado wandered through the American Southwest (1540-42), reaching as far north as Kansas.

COLONIZATION. The first permanent white settlements in the U.S. were made by the Spaniards who founded colonies at St. Augustine, Fla., in 1565, and at Santa Fe, N.M., in 1606. The earliest permanent English settlements were made at Jamestown, Va., in 1607 under the London Co.'s sponsorship, and in 1620 by the Pilgrims at Plymouth, Mass. In 1630 new settlements were founded by the Puritans in the Massachusetts Bay area, foremost of which was Boston. In 1636 the Rev. Roger Williams founded a colony at Providence, R.I., after having been driven from Salem by the Puritans because he preached separation of church and state. In the same year the first settlements were made in Connecticut by migrants from the Massachusetts Bay Colony. In 1634 the colony of Maryland was established under the guidance of Lord Baltimore, a liberal Catholic nobleman. Meanwhile, European immigrants, settlers from Virginia, were moving into the Carolinas. In 1719 the separate colonies of North and South Carolina were established.

In 1626 a small Dutch settlement, New Amsterdam, was founded on Manhattan Island, in the Hudson River, which had been explored in 1609 by Henry Hudson, an Englishman in the service of The Netherlands. In 1664 the entire Dutch colony, known as New Netherlands, was taken by the English and was renamed New York.

In 1733 the colony of Georgia was established by James Oglethorpe, partly as a buffer against



LANDING OF LEIF ERICSSON IN VINLAND, 1001



LANDING OF COLUMBUS IN THE WEST INDIES, 1492

the Spanish in Florida, and partly to help English debtors get a new start in life.

The Swedes had founded New Salem on the lower Delaware, but this colony fell to the Dutch in 1655.

Pennsylvania was founded in 1681 by William Penn as a refuge for Quakers and was held as a proprietary colony by the Penn family for many years.

New Jersey was acquired by William Penn and two Quaker associates from Berkeley and Carteret, proprietors by grant of the Duke of York. In 1702 New Jersey became a royal province.

Meanwhile, French explorers from Canada had been exploring the Great Lakes region and the Mississippi Valley, and had founded colonies in Illinois in the 17th century.

With the elimination of the Dutch and the Swedes, the English controlled the Atlantic Coast from Maine to Florida and were extending their settlements westward into the interior. The



FOUNDING OF THE JAMESTOWN COLONY, 1607



INDIAN ATTACK ON NEW ENGLAND SETTLEMENT



EMBARKATION OF THE PILGRIMS, 1620



PENN SIGNING A TREATY WITH THE INDIANS

French colonies were located west of the Alleghenies, mostly in the Great Lakes and Mississippi Valley areas. The Spanish held a few posts in Florida.

COLONIAL GOVERNMENT. The English colonies had been settled under royal charter to private companies (Virginia, Massachusetts); to proprietors (Maryland, New York, New Jersey, New Hampshire, Pennsylvania, Delaware, the Carolinas, and Georgia); to actual settlers (Connecticut and Rhode Island). By the time of the Revolution all except five had become "royal colonies" under the direct control of the crown. Rhode Island and Connecticut were self-governing. Maryland, Pennsylvania, and Delaware remained proprietary colonies. In the royal colonies, the governor and the leading officials were appointed by the king; in the proprietary colonies, by the proprietors. Each royal or proprietary colony also had a council, which, except in Massachusetts, was also appointed by the king or

proprietor, and usually represented the wealthier classes.

Each colony had a representative assembly which passed laws, levied taxes, and appropriated funds. Its strength was in its control of colonial finances and in its representation of public opinion. Each of the colonies was authorized by a written charter.

COLONIAL LIFE. The emergence of American nationality during the colonial period can be attributed to the amalgamation of many different stocks into a new people and a new country. The English language and English institutions were dominant in all the colonies. Although the majority of the colonists were of English stock, important minorities of German, Dutch, Scotch-Irish, and French stocks existed in the middle colonies.

The development of the American character was a slow procedure, however; and few colonists had any awareness of it. They thought of them-

selves primarily as British subjects and secondly as Virginians, Pennsylvanians, or New Yorkers.

In 1750 the 13 colonies contained about 1,500,000 people. In New England the main sources of livelihood were farming the rocky soil, lumbering, fishing, shipbuilding, and shipping. In New York, New Jersey, Pennsylvania, and Delaware—the middle colonies—farming, small-scale manufacturing, and shipping were the chief occupations. The Southern colonies concentrated on the production of staple crops: indigo, rice, tobacco, mostly on large plantations worked by Negro slaves, though many small farms were worked by white settlers. On the frontier, or in the back country, running from Maine to Georgia, pioneer hunters were followed by log-cabin settlers and later by more substantial farmers.

BRITISH-FRENCH COLONIAL WARS. As the French established their Canadian colonies and began pushing their fur-trading posts into the Great Lakes-Mississippi Valley area it was inevitable that they should clash with the English who were moving westward from the Atlantic coast into the interior. The colonial struggles between the two powers lasted for over 70 years, beginning in 1689 with King William's War and ending with the Seven Years' War in 1763. Despite the French advantages of a long string of forts and settlements stretching from Quebec through Detroit and St. Louis down to New Orleans, a highly centralized government, and greater military strength, the British finally won because of greater population, a better strategic position, a superior navy, and abler leadership. By the treaty of peace in 1763 France lost all of Canada to the British. The Louisiana Territory was transferred from French to Spanish control. Thus, all of North America from the Atlantic to the Mississippi, except for New Orleans and Florida, was now British territory.

PRE-REVOLUTIONARY PERIOD. The ending of the French menace as a result of the victory of British arms in the French and Indian Wars lessened the colonial dependence on Great Britain for protection. It also raised new questions about the relations between Britain and the colonies. Money had to be raised to pay for the war and to provide for colonial defense. Britain expected the colonies to pay their share through taxation. The economic organization of the colonial empire under the Navigation Acts had to be revised and strengthened.

The British government, acting on the principle of mercantilism—the theory that the amount of property, gold, and silver that a nation had determined its power, and that the economy of the colonies should be managed so as to enhance the wealth of the empire as a whole—had passed a series of laws, beginning as early as 1651, to accomplish this purpose by regulating colonial

imports, exports, shipping and manufacturing. The colonies benefited from these Navigation Acts, as did the mother country. They received full protection for their shipping on the high seas and exclusive enjoyment of the British market for various commodities. At first these laws were laxly enforced. After 1763 the British government undertook to tighten the administration of these regulatory acts and to enlarge their scope.

The Sugar Act of 1764 restricted New England's trade with the West Indies to the British islands only and imposed a heavy duty on imported molasses. Export taxes on continental goods shipped to the colonies from Great Britain were also raised in 1764. Customs administration was strengthened. That same year Parliament prohibited colonial paper money from being made legal tender, thus hitting all debtor groups. Western settlers and land speculators were aggrieved by the proclamation of 1763 by which lands beyond the crest of the Appalachians were temporarily barred to settlers in order to prevent too rapid expansion. In order to keep the Indians quiet the colonists were barred from buying Indian lands anywhere.

The British decided to keep 10,000 soldiers in North America and to make the colonists pay one-third of the cost by taxation. In 1765 Parliament passed a bill for a stamp tax on newspapers and legal and other documents, thus enabling the colonists, who up to this time had never been taxed directly, to raise the cry of taxation without representation.

The Stamp Tax was met with rioting in the colonies and by protests from colonial legislatures. The passage of the Townshend Act of 1767, imposing duties on tea, paper, glass, and other items, was countered by an economic boycott against the taxed items. In 1770 Parliament repealed all the duties save that on tea, which was maintained to enforce the principle.

Meanwhile a system of local and intercolonial committees of correspondence were being formed. Samuel Adams of Massachusetts was the principal leader in this movement.

When the colonists virtually ceased drinking tea, in protest against the tax, the British East India Co. fell into financial difficulties. In 1773 the British government arranged for conditions under which the East India Co. could sell tea in America at very low prices, though the three-pence-a-pound tax was still imposed as a test of the government's authority. Colonial indignation rose. On Dec. 16, 1773, a band led by Samuel Adams boarded the British tea ships in Boston harbor and dumped the tea into the bay. In retaliation, the British government closed the port of Boston to all commerce till the destroyed tea was paid for, altered the charter of Massachusetts, and made the British military com-

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mander in America, Gen. Gage, governor of Massachusetts.

These harsh acts brought quick reaction from the colonies. The committees of correspondence went into action; protests were voiced at meetings and in newspapers and pamphlets. On Dec. 5, 1774, the First Continental Congress met in Philadelphia, with every colony except Georgia represented. It drew up a declaration of colonial rights; it prepared an agreement boycotting Great Britain; and it declared that if force were used to punish Massachusetts the other colonies should support the resistance of that colony.

REVOLUTIONARY WAR. The first hostilities between the Continentals and the British regulars broke out on April 19, 1775, at Lexington, Mass., and soon after the colonists were defeated at Bunker Hill in Boston. On May 10, 1775, the Second Continental Congress convened at Philadelphia and made provisions for securing the united action of the colonies. It again petitioned the king and British people for redress, but prepared for actual war and selected George Washington as commander in chief of the Continental Army. The Declaration of Independence was adopted by a unanimous vote on July 4, 1776, naming the new nation the United States of America. Most of the seaport cities were captured by the British, but the Americans held the interior and recaptured some of the cities. The first decisive battle and the one which is considered the turning point of the war occurred at Saratoga, Oct. 17, 1777, when Gen. Burgoyne surrendered with a large army to Gen. Gates.

Besides costing the British one-fourth of their troops in America, the Battle of Saratoga finally convinced the French to give aid to the Americans. On Feb. 6, 1778, an alliance between France and the U.S. was signed. Money and supplies and 6,000 French soldiers were sent to America; and the French fleet harassed the British.

The British, having failed in the North, now turned south and from 1779 through 1781 British and American armies fought. Though the British won many battles, they failed to end the American opposition.

Eventually, Washington, at the head of an American-French army and aided by a French fleet, defeated a British army under Lord Cornwallis at Yorktown, Va. This virtually ended the war. In 1782 the British abandoned the Southern ports and held only New York. The Treaty of Peace was signed at Versailles in 1783. The new nation was conceded all the country between the Alleghenies and the Mississippi; the northern boundary was fixed at almost its present limits. See also *American Revolution*.

INDEPENDENT GOVERNMENT. As soon as the colonies obtained an independent government, they turned their attention to organizing civil institu-



FRENCH AND INDIAN WAR

The English under General Wolfe climbing the Heights of Abraham near Quebec, 1759

tions and developing the natural resources. The Articles of Confederation, adopted by the Continental Congress in 1777 and ratified in 1781 by the states, soon proved unsatisfactory to some classes of the country. Under the Articles, the separate states retained practically all essential rights of government, while Congress had neither the funds nor the authority to exercise any central control. Money and currency, items essential to trade, were under state jurisdiction and showed little uniformity. For purposes of foreign commerce, the various state currencies were inadequate because they were unstable and inflated in value.

These matters, however, were of little importance to the small farmers, artisans, debtors, or laborers, who were seldom involved in traffic beyond the narrow confines of their homes, and who were, in addition, content with a Federal government too weak to levy taxes.

In the fury of revolt against a common enemy, the diverse elements of the American populace had joined in a single cause; each had a fundamental objection to the dominion of the British crown, but each class objected just as strongly to the rule of any other group. While the farmers probably would have preferred to continue under a loose association of sovereign states, they were tired of war and feared that the new and weak republic would soon be subjected to another contest of arms unless a strong union were organized. The fact that the states were hemmed in by the colonies of England and Spain emphasized the need for strength.

Reluctantly, then, the anti-union parties agreed



Courtesy New York Historical Society

THE FIRST AMERICAN FLAG

According to legend, Betsy Ross made the first American flag

to discuss a new constitution with the impatient merchants of the North and other men of property. A convention was called in Annapolis in 1786, but only five states bothered to send delegates. Indefatigable in his desire for a constitutional union, Alexander Hamilton, a leading figure of the period, proposed a meeting the following year at Philadelphia. To induce the wayward

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states to participate, Hamilton announced that only a revision of the Articles was contemplated and gave assurance that nothing would be finally approved without the ratification of the states. Thus rendered attractive, the convention now drew 55 delegates from all the states (except Rhode Island), who set to work upon one of the most remarkable documents in the history of politics. But the leaders of the opposition wing were conspicuously absent: Jefferson was then representing his government at Paris; Thomas Paine was in Europe on private business; Patrick Henry and Samuel Adams refused to attend. The convention thus remained, for all practical purposes, the private monopoly of men of affairs—men who wanted a union dedicated to the protection of private property. They obtained such a Constitution, but very nearly failed to obtain union. With his practical talent for compromise, Washington, who was made president of the convention, was able to obtain the signature of 39 of the 55 delegates to the document, although he could not refrain from describing the Constitution as “not free from imperfections.” Considering the “diversity of interests that are to be attended to,” however, he urged its acceptance by the people.

The Constitution was hardly designed to appeal to the common man; rather, it was devoted to the establishment of careful counterbalances of government power that would insure against any infringement of private property. Regarding human rights or political liberties, nothing was done until the first ten amendments (Bill of Rights) were later adopted in 1791. In Paris, Jef-

BATTLE OF LEXINGTON, 1775





SURRENDER OF CORNWALLIS AT YORKTOWN, 1781

erson was greatly disturbed by the product of the Constitutional Convention; at home, it caused rioting in the streets by men who saw their revolutionary battles of a few years earlier being thrown into the discard of history.

The struggle over ratification, however, was still to come. The people joined whichever camp represented their economic interests, and the country's foremost political thinkers hotly debated the issue from the platform and in the press. Advocates of the Constitution were known as "Federalists," opponents were called "Anti-Federalists." Of the countless pamphlets issued at the time, possibly the best (and certainly the best remembered) were the writings of Hamilton, Madison, and Jay in support of the Constitution, known as the *Federalist* (q.v.).

The Constitution went into effect on June 21, 1788, when New Hampshire, the ninth state, voted its passage. Virginia and New York joined the fold a few weeks later after a bitter struggle in both states, but Rhode Island and North Carolina continued their separate existence until economic necessity compelled their adherence more than a year later. The first Congress under the Constitution met at New York City on March 4, 1789, as provided for in an ordinance passed in September 1788 by the outgoing Congress. The ordinance also set the dates for the appointment of Presidential electors and for their balloting. The first session of the Congress began without a quorum on March 4; the House of Representatives was organized on April 1, and the Senate met on April 6. On April 30, 1789, Washington was inaugurated as President of the U.S. His

Vice President, John Adams, had already taken the oath of office on April 21.

FEDERAL GOVERNMENT. Important decisions awaited the new government. The machinery of the government had to be organized, financial problems had to be solved, foreign affairs to be attended to. Congress quickly passed a tariff imposing a small duty on imports to raise revenue for the conduct of government. The State, Treasury, and War departments were organized, and the office of Attorney General was created. Thomas Jefferson was appointed to the most important office, Secretary of State. The young but able Alexander Hamilton became Secretary of the Treasury. The Judiciary Act of 1789 created the Federal judicial system and established the Supreme Court. Ten amendments to the Constitution, the Bill of Rights, which guaranteed civil liberties, were approved and submitted to the states for ratification. The amendments were approved by the states and became part of the Constitution in 1791. The incorporation of the Bill of Rights into the Constitution helped to mollify some of the critics of the Constitution.

The next step was aimed at achieving union of a still more substantial sort: the financial structure of the states verged upon chaos when Alexander Hamilton, Secretary of the Treasury, proceeded to introduce monumental reforms. The first item on his agenda consisted of funding the entire national debt, foreign and domestic, i.e., all old bonds and other obligations were to be replaced by new ones drawn on the Federal treasury. The second item consisted of assuming all the indebtedness of the states incurred in con-

nection with the Revolution. By these steps he not only redeemed worthless securities, but also laid the groundwork for a powerful national union. Henceforth, the Federal government rather than the states would be dominant in public finance. As an integral part of his monetary structure, Hamilton established a National Bank through which the government might issue a single, stable currency. Together with a program of protective tariffs and an excise tax on distilled liquors, these measures completed Hamilton's financial program.

Farmers and landowners, especially in the South, felt that they had been duped by Congress. During the trying days of revolution, they had bought state and national bonds as a contribution to the struggle; they had watched these bonds become nearly worthless as the credit of the states declined and their currencies were inflated; to salvage what they could, they had sold them to shrewd Northern speculators at a small fraction of their face value. All this they had done without marked resentment, but now the prospect of the huge profits that would be made by the speculators angered the people and precipitated a renewal of sharp political feeling. Most of the bonds had gravitated to the North, headquarters of financial speculators. The South, therefore, was now faced with the double indignity of having to pay the taxes which would be used to redeem bonds held (immorally, as they thought) by Northern bankers. The issue was bitterly contested, and originally failed to pass Congress. Jefferson, however, returned from France in the midst of the debate and, convinced by Hamilton that the North would secede from the Union unless the bill were passed, he carried into the Hamiltonian camp enough legislators to enact the law. In return, the South demanded and obtained the establishment of the new national capital on the banks of the Potomac.

The excise bill, which had encountered such opposition in Congress, encountered even more opposition in enforcement. The farmer-distillers of the western counties resented the tax and its interference with their affairs, culminating in the Whiskey Rebellion of 1794. Not till an army of 15,000 led by Hamilton was dispatched to western Pennsylvania did the rebellion vanish. The Federal government had established its authority and its determination to collect taxes.

PARTY POLITICS. Out of these and similar issues grew strong factions. While the merchant, trader and banking classes had tangible proof of the value of a strong national government, workers and farmers began to fear that they had little to expect from the new order.

Washington tried to keep the Executive Department nonpartisan, but staffed with officials friendly to the Constitution. But friends of strong

state government in Congress began from the outset to question the centralizing influence of the administration's policies. When Hamilton won a victory over Jefferson in the controversy over the National Bank the split between the two opposing tendencies in national government widened. Jefferson tried unsuccessfully to have Hamilton removed from the cabinet. After being convinced that Washington favored Hamilton's views, Jefferson resigned his cabinet post in 1793 and retired to private life, and to the organization of an anti-administration political party. Jefferson consolidated the rather loosely organized opposition to Hamilton's policies into an effective political party which became known as the Republican party and was later dubbed the Democratic-Republican party by Hamilton in an attempt to discredit it with conservatives. Jefferson's followers drew their support largely from the masses and the former Anti-Federalists. Supporters of Hamilton's system took the name of the Federalists and under Hamilton's leadership became a powerful instrument for the support of the Constitution and the interests of the propertied classes. In the words of John Adams, staunch Federalist, who succeeded Washington to the Presidency in 1797, the Federalists stood for "an aristocracy of talent and wealth." By one of the anomalies of history, the slave-holding planters of the South were attracted to Jefferson's Republican party (as it came to be known), and became, in the popular mind, the champions of the common man.

While the infant republic was struggling to establish a government and solve internal problems, it was confronted by the danger of being drawn into war again. Shortly after Washington's inauguration the French Revolution broke out, which embroiled France in a civil war at home and a war with Great Britain, Prussia, Austria, and Spain. The French Revolution split Americans into two violently opposed camps. In general the Federalists looked with disfavor on the revolutionists, while Jefferson and his followers supported them. Washington was faced with the problem of how to avoid being drawn into the struggle between revolutionary France and her foreign enemies. If the U.S. had to take sides, would it be with our recent ally, now revolutionary France, or with Great Britain, our recent enemy?

By the terms of the Treaty of 1778, the U.S. had promised to return the aid given by France during our revolution. France proceeded to invoke the treaty, but Washington replied with a declaration of neutrality in 1793. The mercantile states approved this decision because it preserved a lucrative trade with England, but the French government was outspoken in its hatred and contempt.



Courtesy Metropolitan Museum of Art, N. Y.

WASHINGTON AND LAFAYETTE AT MOUNT VERNON

Another action which heightened U.S. difficulties with France was Jay's Treaty, negotiated between the U.S. and England in 1794. The treaty eased some tension between the two countries by providing for British withdrawal from military posts on U.S. territory, for commissions to arrange settlement of pre-Revolutionary debts owed by the states, and for improved trading conditions. The treaty, ratified by Congress in 1795 after long debate, was regarded by France as pro-British.

In the midst of this domestic and foreign turmoil, Washington's second term drew to an end. Seeing himself rebuffed by his country, he welcomed the prospect of retiring to Mt. Vernon and resisted offers for a third term. The Federalists nominated John Adams to succeed him, and the Anti-Federalists rallied behind Jefferson. Adams, with the most electoral votes, was named President; Jefferson, with the second-largest vote, became Vice President, as provided by the Constitution.

During Adams's administration, U.S. relations with France deteriorated seriously. A U.S. commission sent to France to re-establish friendly relations was approached unofficially by agents of France's foreign minister. The agents, referred to as X, Y, and Z when Adams related the story to Congress, tried to extort a bribe and loan from the U.S. before they would open negotiations. The XYZ Affair (*q.v.*) turned a large section of American sympathy away from France. It was not hard to believe in view of the undoubted insolence of Citizen Genêt, who, a few years earlier, had been sent to the U.S. as first minister from the revolutionary French Republic. He had violated American neutrality by fitting out privateers in

American ports and by organizing an armed expedition to attack Spain in Louisiana. Washington brought about his recall. Shortly after Genêt arrived in the U.S., France authorized its navy to seize foodstuffs and British private property even on neutral ships. Although it was soon withdrawn, this decree resulted in much damage to American trade in French ports. Without a declaration of war, active naval fighting broke out in 1798. The tiny American navy captured 84 French ships and wrecked French commerce in the West Indies. The war threw the Republicans into confusion. To continue their pro-French agitations in the midst of hostilities would amount to treason; on the other hand, they were not prepared to discontinue their opposition to the Federalists. The latter seized the opportunity to destroy the rival party. Over the opposition of sober Federalists such as Hamilton and Marshall, Congress passed the Alien and Sedition Laws of 1798. The former law, never enforced, gave the President the right to expel foreigners from the country, especially Irish and French immigrants who shared the anti-British feelings of the Republicans; the latter law, which was much exercised, made criticism of the government a crime and was used to imprison Republicans and destroy their press. In hot anger, Jefferson and Madison, respectively, drafted the Kentucky and Virginia Resolutions in 1798, declaring these laws unconstitutional and threatening to disobey them because Congress had exceeded its authority in passing them.

At this juncture, Napoleon Bonaparte, who had seized control of France as First Consul, made it known that he was ready to deal with the U.S. Adams, disregarding the pro-British

Federalists who wanted war with France, sent to France envoys who negotiated a settlement with Napoleon in a treaty signed in 1800.

THE ELECTION OF 1800. By 1800 the U.S. was ready for a change in government. The Federalists had served the country well in establishing a strong government, but their philosophy of government was to favor special classes and to ignore the needs of the common people. Jefferson had built up a great following of small farmers, mechanics, and shopkeepers. During President Adams' administration, the Federalists had steadily lost favor with the people because of the Alien and Sedition Laws and the higher taxes made necessary by the undeclared war with France. Adams himself was unpopular with many Federalists because of his antiwar policy and his tactlessness. Hamilton openly opposed him. Adams was renominated because the Federalists could not agree on another candidate. Jefferson and Aaron Burr were the Republican candidates for President and Vice President. The Republicans swept the South and won a heavy majority in the Middle States. Adams carried New England. Although the Republicans won the election, the choice of the President was thrown into the House of Representatives because the ambiguous election machinery provided by the Constitution resulted in both Jefferson and Burr receiving 73 electoral votes each, against 65 for Adams. Jefferson very clearly had been intended by the people to be President, but Burr refused to yield. It was only after Hamilton intervened in his favor that Jefferson was chosen President by the House of Representatives.

REPUBLICANS IN POWER. The victory of the Republicans in 1800 influenced the course of U.S. history in favor of popular democracy. Jefferson announced that his administration would emphasize simplicity and economy in government; the rights and powers of the people; freedom of speech, press, and religion; encouragement of agriculture and the spread of education; friendship with all nations and entangling alliances with none; and, finally, the restriction of the Federal government's activities.

Jefferson tried to carry out his avowed beliefs in his administration. He introduced a policy of drastic economy which turned a government deficit into a surplus; he encouraged immigration through liberalization of the naturalization law; he repealed the Hamiltonian excise tax on whiskey and aided agriculture. In the handling of official functions also, he favored simplicity, in contrast to the formality and dignity that had characterized Federalist functions.

Despite Jefferson's efforts, he was forced by the necessities of the times to adopt measures which were Federalist in tone and to stretch the powers of the government in a manner which was widely

at variance with his philosophy of "strict construction" of the Constitution.

THE LOUISIANA PURCHASE. The Louisiana Purchase was immediately dictated by the Napoleonic wars. New Orleans, strategically situated on the Mississippi, had become the main avenue for most of the trade of the Western states and territories. When Spain ordered the closing of the port to American trade in 1802, the farmers appealed desperately to the President they had so recently elected and prepared to resist with force this interference with their trade. Hardly had the terrible news been heard in Washington when an equally alarming report was circulated to the effect that Spain had secretly ceded the territory to Napoleon in 1800. The latter's plan for world dominion had been less frightening when seen from afar; now that he enjoyed a stranglehold on the main artery of Western trade, he loomed suddenly as the greatest enemy of the American farmer. Moreover, a lull in the European fighting gave rise to the suspicion that he would now try his hand at colonial development on this side of the Atlantic. Jefferson, anxious to avoid war at any cost, instructed his envoys to attempt to purchase the port of New Orleans for \$2,000,000. At this juncture, the French dictator was plunged into a renewal of his European war, and, realizing that he could not succeed in holding his American territories against the British Navy, replied by offering for sale his entire New World empire. It was more than Jefferson had bargained for; only a short time before, he had excoriated the Federalists for their extravagance and had pledged himself to a policy of retrenchment. Now he was confronted with a bill for \$15,000,000 which he could not afford to refuse. Moreover, there was no authority in the Constitution for the purchase of new lands, and no one had argued more vigorously the virtues of "strict construction."

Jefferson proposed a Constitutional amendment to authorize the purchase, but he was convinced by friends that Napoleon might change his mind if the U.S. delayed. He finally made the purchase without a clear grant of authority under the Constitution and without Congressional approval. This was "loose construction" in the extreme, but Jefferson justified his act by appealing to the good sense of the country. By this purchase in 1803, the U.S. acquired more than 1,000,000 sq. m. of territory, the central river system of the continent, and the valuable port of New Orleans. The Lewis and Clark expedition, 1804-06, explored the Louisiana Territory, paving the way for American fur traders and settlers, and established a basis for American claims to the Pacific Northwest.

One of the early acts of the Jefferson administration was to propose for ratification by the

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states the 12th Amendment to the Constitution. The unfortunate stalemate in the Jefferson-Burr election had occurred because the Constitution had failed to provide for separate balloting by the electoral college for Presidential and Vice Presidential candidates. This defect was now remedied, eliminating the possibility of a similar controversy in the future. Jefferson ended his first term at the height of his popularity. The country approved the purchase of the Louisiana Territory and the prosperous condition of business. In the election of 1804 Jefferson was re-elected, carrying every state except Connecticut and Delaware. The next year he announced that he would not be a candidate for a third term, thus strengthening the precedent which Washington had established.

EUROPEAN CONFLICT. For the greater part of Jefferson's administration, American neutrality was strained by the Napoleonic Wars. Locked in a death struggle, England and France sought to blockade each other's coasts in 1806. Without a navy, France only declared a "paper blockade," but England eventually assumed the right to stop American ships, search them, and seize any seaman claimed as a British subject. This policy of impressment aroused anger, but the profits to be obtained from blockade-running were too great to stop the traffic. If this alone was not sufficient cause for war, an ample excuse could certainly have been found in 1807 when a British warship opened fire on the American vessel *Chesapeake* for refusing to yield a part of its crew. Two factors, however, operated against a declaration of war. One was Jefferson's firm determination to preserve peace as long as possible, and the second was the fact that French treatment was no less obnoxious; the latter did not have the navy to intercept American ships at sea, but in all other respects France was as much of a potential enemy as England, and the U.S. could not undertake a war with both. In an effort to preserve American neutrality and to obtain fairer treatment from France and Great Britain, Congress, at Jefferson's bidding, passed the Embargo Act in 1807, which forbade all foreign commerce. This drastic move almost wrecked the American shipping industry and reduced American exports by four-fifths, thereby causing farm prices to drop sharply. The embargo failed to change the policy of either England or France, and, as a result of discontent at home, Congress passed the Non-Intercourse Act in 1809, three days before Jefferson went out of office. It forbade trade only with Great Britain and France. In 1810 Congress provided that as soon as Great Britain or France withdrew their decrees against American shipping the Non-Intercourse Act would be applied against the other country.

Jefferson's second term expired in the midst of



CEREMONY CELEBRATING THE LOUISIANA PURCHASE, 1803



LEWIS AND CLARK EXPEDITION EXPLORING THE LOUISIANA TERRITORY

this critical international situation. The Federalist party was too weak to offer serious resistance in the election of 1808, and James Madison, "Father of the Constitution" and Jefferson's Secretary of State, rode easily into the office on the Republican ballot. Following his predecessor's policy, he attempted to avert war. In 1810 Napoleon announced that he had abandoned attacks against American shipping. Although this was untrue, the U.S., acting on his good faith, lifted its embargo against trade with France and limited non-intercourse to Great Britain, which retaliated with more vigorous impressment of U.S. seamen and a blockade of New York. Although freedom of the seas had become a sacred principle in American politics, it was not the merchants who reacted most belligerently to the deepening crisis. For the farmers, commercial freedom suddenly loomed as a critical issue: their produce now rotted in the fields or in the warehouse, and

England was held responsible for keeping American ships in port.

But it was for another, domestic, reason that many Americans wanted war with England. They looked to the unsettled frontiers for the next avenue of expansion, only to be confronted by two foes. The Indians of the Northwest, seeing the direction of colonization, were anxious to discourage further movement into their homelands. Indians led by Tecumseh were attacking settlers in the Northwest. The British feared a westward movement would menace Canada. For this reason they helped the Indians, and encouraged the warlike forays that laid waste many frontier settlements. Spanish Florida was also eyed hungrily by the agricultural expansionists, who saw in a war with England the single answer to their many problems. The expansionists were represented by some of the young Republican members of Congress known as the "War Hawks," including Henry Clay of Kentucky.

WAR OF 1812. The second war between the U.S. and Great Britain came only 29 years after the first. The formal declaration of war by the U.S. (June 18, 1812) was preceded, two days earlier, by British revocation of the Orders in Council against American shipping; the war was therefore unnecessary. "Mr. Madison's War," as its opponents called it, was, ironically enough, supported enthusiastically by the West and the South, which had suffered least from British interference with American shipping, and was generally opposed in New England and the Middle States, which had been affected the most. Two unsuccessful invasions of Canada, in 1812, were followed by a successful invasion under Gen. Ripley and Gen. Scott in 1814, who captured Chippewa and administered a partial defeat to the British at Lundy's Lane. The British attempted an invasion by way of Lake Champlain, but were defeated by the American fleet. However, they successfully ascended Chesapeake Bay, defeated the Americans at Bladensburg, and on Aug. 24, 1814, captured Washington. At this critical turn, the Federalists of New England, who had never been reconciled to the war, saw a justification for their skepticism. Fearing the growing power of the South and West, as well as loss of its commerce, New England was not cooperative, refusing to send its militia outside its boundaries and responding inadequately to the call for war loans. In 1814 New England's opposition to the war reached its height when all commerce was virtually ended. Late in that year delegates from five New England states met in secret in Hartford and drafted resolutions condemning the war and enunciating a doctrine very similar to the Southern theory that states could nullify acts of Congress which they considered to violate the Constitution. The year 1814 saw a turn in favor

of American arms at sea, and the opposition was effectively silenced. Greater success crowned the Americans in naval contests, especially on the Great Lakes, where Capt. Oliver Hazard Perry destroyed a British fleet. The war ended with the signing of the Treaty of Ghent, signed on Dec. 24, 1814; but the last battle occurred on Jan. 8, 1815, at New Orleans, where Gen. Andrew Jackson defeated the British under Gen. Edward Pakenham before news of the peace treaty reached the U.S.

In the course of the struggle, several significant changes took place which tended to lessen the causes of factionalism and pave the way for a new period of national development. The embargoes and the war itself had caused commercial New England to turn to manufacturing on a larger scale than ever before. If the country was not yet industrially self-sufficient, it held the promise of soon being able to supply its own manufacturing needs with merchandise "made in America." Earlier Republican opposition to the protective tariff desired by the Federalists was all but forgotten as the administration found itself obliged, due to the cost of the war, to adopt a revenue tariff in 1816. The motivation of the agrarian leaders differed from that of their predecessors, but the results were identical and suited the manufacturers just as well. The charter of Hamilton's National Bank had expired in 1811, and President Madison had permitted it to lapse without renewal. The war, however, had produced dangerous inflation, and the country's credit was severely damaged. Once more, therefore, the Republicans yielded to a Federalist device; and Madison, who had denounced Hamilton's bank as unconstitutional, authorized the creation of a second U.S. bank in 1816.

Henry Clay, spokesman for the Western frontier, formulated his "American System" which combined a high protective tariff with Federal aid to internal improvements. By these measures he hoped to protect American manufacturers against foreign competition and to widen the market for farm products by providing better transportation to the East. These policies, he argued, would benefit all sections of the country. The building of canals, such as the Erie Canal connecting the Great Lakes and the Hudson River, and, later, the building of railroads bound together the different sections of the country more closely. In 1824 tariff rates were raised, but the sectional vote on this bill foreshadowed the ending of political harmony.

In terms of its ostensible causes, the War of 1812 had accomplished nothing. The Treaty of Ghent, for example, did little except to guarantee pre-existing boundaries and bring an end to hostilities. England did not, in theory, renounce her right to search and impressment, but in prac-

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tice, she no longer had any reason to use such measures; the war in Europe had ended in 1814 with the defeat of France.

ERA OF GOOD FEELING. The most important and intelligent of the Federalist leaders were not slow to recognize the changing state of affairs. The disloyal Hartford Convention, coming as it did just as the War of 1812 was ended, made the Federalists subjects of contempt and ridicule. Although they nominated a candidate for the Presidency in 1816, they were not averse to allowing their party to expire peacefully. James Monroe was swept into office on an unprecedented tidal wave of amiability and good feeling that survived his eight-year tenure but was not soon to be repeated in American history.

The Indian power had been broken by the war, and the admission of the States of Indiana (1816), Mississippi (1817), Illinois (1818), Alabama (1819), Maine (1820), and Missouri (1821) pushed the frontiers of the nation north and west in relative safety. The expansionists of the South, who had cried for war in the hope of annexing Florida, had been frustrated by Spain's refusal to join the fray; but here, too, they accomplished by direct means what the legalities of war had failed to do. Ordered to suppress Indian forays across the border of the Spanish colony, Gen. Andrew Jackson, by a liberal interpretation of his instructions, occupied Florida in 1817 and 1818, defeated the Indians, hanged their British leaders, and hoisted the American flag over the Spanish capitals.

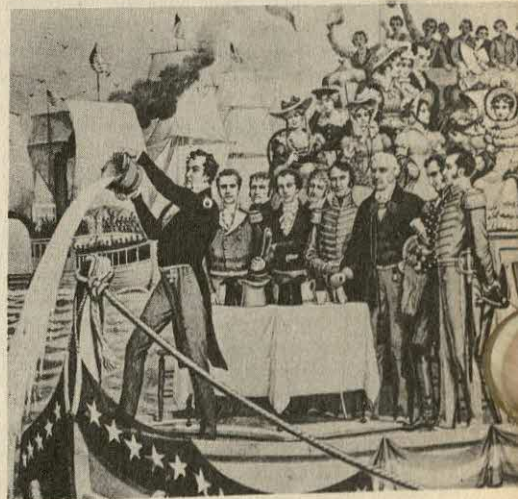
The *de facto* separation of Florida from Spain climaxed the disintegration of Spanish America. Independence movements were fostered by British and American traders who had made great inroads on the colonial markets while Spain was occupied with the Napoleonic wars. Realizing that a concerted Anglo-American effort would snap her hold on the Western Hemisphere, Spain attempted to conciliate the U.S. by ceding the Florida territory (1819) which, in any case, was already lost to her. A payment of \$5,000,000 was agreed upon, and was to be paid to American citizens who had claims against Spain.

MONROE DOCTRINE. Hopeful of American neutrality, Spain then appealed to the reactionary Holy Alliance (Austria, Prussia, Russia) to reinforce tottering royal authority in the Americas. Despite England's professed love for the monarchical principle, her interests were contrary to those of the Holy Alliance; a return of the Spanish colonies to royal domination would disrupt a flourishing trade. Meanwhile Russia's claim to the territory south of Alaska was conflicting with American and British claims to the Pacific Northwest. Since the viewpoints of the U.S. and Great Britain were identical on these questions, the two nations took counsel. Out of their delibera-



WAR OF 1812

Andrew Jackson at the Battle of New Orleans, 1815



OPENING OF THE ERIE CANAL, 1825

tions came the Monroe Doctrine, contained in the President's message to Congress of Dec. 2, 1823. Monroe declared clearly that any attempt to colonize the Western Hemisphere or to intervene to oppress the newly founded Latin-American states, would be regarded as an "unfriendly act" by the U.S. This unambiguous statement, guaranteed in effect by the British Navy, discouraged the ambitions of the Holy Alliance. Although the Monroe Doctrine was aimed chiefly at Spain, Russia also read the implied warning and gave up all claim to the American Pacific coast south of Alaska.

JOHN MARSHALL AND THE SUPREME COURT. National unity was also strengthened by the decisions of the Supreme Court. Chief Justice John Marshall, a leading Federalist, appointed by Adams just before he yielded the Presidency to Jefferson, transformed the Court from a weak

and insignificant tribunal to a powerful branch of the government as important as the Presidency or Congress. Marshall's opinions in a long series of decisions on Constitutional issues firmly established the supremacy of the Constitution and extended the power and scope of the Federal government. In *Marbury vs. Madison* (1803), Marshall established the right of the Supreme Court to review any law of Congress.

In *McCullough vs. Maryland* (1819) and *Gibbon vs. Ogden* (1824), the implied powers of the government under the Constitution were upheld. The Supreme Court established its power to overrule state legislatures in *Fletcher vs. Peck* (1810) and to set aside decisions of state courts in *Martin vs. Hunter's Lessee* (1816).

SECTIONAL RIVALRIES. Monroe's "Era of Good Feeling" was followed by a period of bitter sectional rivalries. Differences between the industrial East and the plantation South arose on questions of tariffs, money, government, and Federal aid to roads and canals. The West and the South wanted cheap land; the North was opposed. Western democracy was opposed to Eastern conservatism; North and South split on the slavery issue. The election of 1824 brought out some of these sectional animosities. A heated race between four Republican candidates resulted in a stalemated election that was thrown into the House of Representatives for decision. General Andrew Jackson of Tennessee, hero of New Orleans and apostle of the frontier farmer, polled the largest popular vote, but the House awarded the Presidency to John Quincy Adams of Massachusetts, son of the second President. Henry Clay, Speaker of the House and another contender in the election, threw his votes to Adams. When Clay was awarded by Adams the coveted office of Secretary of State, the Jackson forces proclaimed to the world that a "corrupt bargain" had been made. Never delicate in their criticism, the frontiersmen set to work immediately to defeat the President four years later.

JACKSONIAN DEMOCRACY. The election of 1828 marked another milestone in American politics. As in 1800, when Jefferson's new political force swept out the old, so did the Jacksonian wave defeat and destroy the Republican party. To distinguish himself from Adams, nominally of the same party, Jackson adopted the original but forgotten Jeffersonian name of Democrat; for the same reason Adams accepted the appellation of National Republican, later to be replaced by that of Whig. The conservative elements of the East rallied around the banner of President Adams, conducting a bitter campaign of personal vilification against Jackson. In this, however, they were no match for "Old Hickory," who, moreover, had captured the imagination of the farmers and laborers who now made up the bulk of the elec-

torate. The campaign of 1828 was a prolonged brawl in which no personal detail was considered unworthy of publication. However unseemly, this conduct had political value, and the vote showed a large-scale reaction against gentlemanly government in favor of the virile kind of administration expected from a man of the people. Not all of Jackson's supporters approved of his rugged qualities; the aristocracy of the South, for example, although more at home in Mr. Adams' drawing room, preferred Jackson for the States' Rights doctrine which, they mistakenly believed, would protect them from excessive concentration of power in the North. Besides, Jackson was himself the owner of many slaves.

Jackson is often identified with the "spoils system," a term coined during his administration and used ever since to refer to the practice of political patronage. After his election, he dismissed a number of officeholders appointed by his rivals and appointed his loyal followers to the posts. If the spoils system did nothing to improve governmental efficiency, it did much to solidify party machinery by giving tangible rewards for party loyalty. Jackson put into practice his ideas of government. South Carolina was dealt with firmly when it attempted to nullify the protective tariff of 1828. Jackson threatened to send troops to Charleston and proclaimed that disunion by force was treason. He vetoed the bill renewing the charter of the Second Bank of the U.S. because it had meddled in politics on the Whig side and because it represented the money power. The veto became the chief issue of the election of 1832, in which Jackson overwhelmingly defeated Clay. France was dealt with sternly when it failed to meet its obligations to the U.S.

Meanwhile, a distinctive American way of life was slowly coming into flower. From being a minor adjunct of European civilization, the new country was developing in stature and creating an independent culture. Following the 1820's, immigration began to increase to a point where it could affect the national composition and character of the people. Most of the early immigrants were northern Europeans—Irish, German, English. In the same period, other cultural developments left their imprint on the nation. In education, the battle for free public schools—non-sectarian, publicly controlled, and tax supported—was fought by democratic and humanitarian forces, led by Horace Mann. Opposed were conservatives, those who supported parochial schools, planters, farmers, and aristocrats. Gradually, the battle for public schools was won. Religious sects, democratic in government, preaching personal conversion and appealing to the emotions, flourished in the West. Imprisonment for debt, a condition which excited much popular sympathy at the time, was abolished in the North and in some

of the Southwestern states; prison reforms wiped out some of the more inhuman phases of punishment; flogging was eliminated from the catalog of legal reprisals. Still working at the bottom of the social heap, reformers tried to ameliorate the condition of other unfortunates: the insane were removed from ordinary jails and given special places of confinement; education of the blind was undertaken on a relatively large scale.

Underlying these reforms was a widespread humanitarian movement that caused many people to open their hearts to human suffering. Political and social evils came in for their due share of consideration: the experiments of Robert Owen (*q.v.*) in socialist living were typical of the tendency, as were the earliest movements toward woman suffrage and prohibition. A distinctive American literature was emerging in the writings of Emerson, Longfellow, Hawthorne, Lowell, Whittier, Irving, Cooper, Bryant, Poe, Whitman, and Melville. See *American Literature*.

SLAVERY. Important as this whole scheme of humanitarianism may have been in the American scene, one of its phases so far outshaded the rest as to become a prevailing *motif* for a generation of political agitation: No evil of our time, said the Abolitionists, could be compared with the fact of human slavery.

Negro slavery had existed in the American colonies, mostly in the Southern ones, since the earliest days. In the early years of the republic, Northern states began to emancipate slaves and there was some emancipation even in the South where slavery was not proving to be too profitable. The movement to free the slaves was gaining ground. In 1808, the slave trade was abolished and many Southerners thought that slavery would disappear in time. In the decades which followed, however, slavery became firmly entrenched in the Southern states, mostly because new economic factors made slavery profitable.

The growth of the cotton-growing industry in the South (based largely on Eli Whitney's invention of the cotton gin in 1793), the development of the Louisiana sugar-cane industry, and the spread of tobacco culture, all made slavery a profitable institution once more and spread the Southern plantation system westward into the lower South, to the Mississippi River and to Texas. The humanitarian, economic, and political disputes over slavery were destined to keep the country in a turmoil for half a century.

In the framing of the Constitution, the slavery issue had been judiciously compromised to give the South partial representation for the slave population, and these extra votes had an effect upon the balance of power in the House of Representatives. In 1819 the free states and the slave states were evenly balanced, thus preventing either group from controlling the Sen-

ate. That year Alabama and Missouri both applied for admission into the Union. If both were admitted as slave states the balance would be ended in favor of the South, which would thereby control the Senate. The North rallied to oppose Missouri's entry as a slave state. In 1820 Henry Clay arranged a compromise by which Missouri was admitted as a slave state; Maine was separated from its parent state, Massachusetts, and admitted as a free state. The balance was once more restored. Finally slavery was excluded from the Louisiana Territory north of 36° 30' except for Missouri. A truce had been declared, but a final settlement of the slavery issue had to wait another 45 years.

Slavery came to acquire a significance out of proportion to its real importance. Pioneer agriculturalists demonstrated even in this early period that cotton could be raised profitably by free white labor while many slave-owners were operating at a loss; the most successful and enterprising planter could never hope to rival the fortunes of Northern manufacturers; left to itself, the South might well have discovered what all the world knew: that slavery was an unprofitable anachronism in the industrial era.

But the South was not left to itself. The acrid blasts of the Abolitionists sweepingly condemned many institutions that prevailed below Mason and Dixon's line. Federal power was being concentrated ever more strongly in the hands of Northerners, from whom the South differed on other, and stronger, grounds of economic interest, such as tariffs, banks, and internal improvements. Not only in the matter of slavery, then, but in much that concerned its way of life, the South was on the defensive against the rest of the country; its "peculiar institution" was selected by both sides as the focal point of hostilities.

PANIC OF 1837. Coming as it did at a time of feverish speculation in Western lands, railroad building, and bumper cotton production, the decline of the Bank of the U.S. uncapped an inflationary spiral. "Wildcat banks," comparatively unsound institutions incapable of withstanding great economic crises, sprang up in large numbers; the currency issued by these banks was largely inflated and insecure. The problem became still more acute when a law of 1834 established a coinage ratio of 16 to 1 between silver and gold, driving the latter metal out of the money market. The country, however, dazzled by booming finance, did nothing to avoid the impending crash. An increasing Treasury surplus was quickly distributed at the urging of Henry Clay before it could be used by the South to justify a demand for reduced tariffs. The climax came in Jackson's "specie circular" of 1836 in which he repudiated the inflated currency by ordering the Treasury to cease accepting paper money in pay-

ment for public lands. The sudden rush to redeem paper money for gold and silver caused a run on the existing banks; hundreds of them failed, taking with them thousands of citizens and private businesses. Almost simultaneously, a depression in England led to the curtailment of cotton purchases, making the financial debacle national in scope. The Panic of 1837 was inherited, with all its ramifications, by Martin Van Buren, Jackson's Democratic successor. Only one of his attempts to cope with the depression had any permanent value, and that was the creation of the Sub-Treasury System in 1840. To avoid a repetition of the 1837 situation in which the closing of state banks had tied up government funds, Van Buren provided for the construction of vaults in several large cities for the storage of these funds. The expedient proved an aid to stability, but by freezing large sums it tended to discourage business activity. Depressed conditions in the East had the further effect of stimulating westward migration, and the continuing hard times enabled the opponents of the Democratic party to rise again in the political firmament. By this time the opposition had organized the Whig party which nominated William H. Harrison who had decisively defeated the Indians at Tippecanoe in the War of 1812. As his running mate, the Whigs offered an anti-Jackson Democrat, John Tyler of Virginia. The election marked a milestone in American politics; if there were any issues at stake, the electorate was never informed of them; Harrison's attractions consisted chiefly of the fact that, having played practically no role in politics, he had made few enemies. Behind him were such men as J.Q. Adams, Clay, and Webster; such disparate elements as Southern planters, Northern conservatives and Abolitionists. From this heterogeneous union no coordinate program could be expected; the campaign revolved around a dispute as to whether it was more manly to drink hard cider in a log cabin—as Harrison was reputed to do—or to drink scented wine in a mansion—the popular picture of Van Buren.

Hard cider carried the day by a four-to-one majority, but Harrison died a month after his inauguration, and John Tyler succeeded to the Presidency, becoming the first Vice President to take office through the death of the President.

The unreal fusion of divergent elements quickly produced open warfare within the party. Tyler yielded to a tariff measure desired by the North, signed the "log-cabin" bill which allowed frontiersmen to make legal claim to land without immediate payment, and continued Harrison's projected revision of the civil service. But no amount of urging by his Northern cohorts could induce him to establish another National Bank. Within six months of taking office, Tyler was expelled from the Whig party. Shortly after, he

formed a political alliance with Calhoun, a Southern, anti-Jackson Democrat who proposed to make his party into a Southern proslavery instrument.

This decision on the part of Southern leaders was dictated by the practical necessity of deciding the slavery issue on the Western lands which were rapidly filling up. It was obvious that without being able to extend slavery to the new South, they would not long be able to hold it where it already existed; since new states were in the process of formation from the Western lands, they must either be won over to the cause of the South or be allowed to fall into the hands of their enemies.

"MANIFEST DESTINY." As America moved westward, the idea began to take root that the nation had a "manifest destiny" to expand its borders to the Pacific and to expel alien rule from lands occupied or desired by Americans. This Western nationalism focused upon three regions: Oregon, which was under joint U.S.-British authority, Texas and California, both under Mexican control. An American-led revolt in 1836 separated Texas from Mexico; almost immediately after the "Lone Star Republic" applied for admission to the Union, but this project was delayed by Northern legislators who feared the political weight of this vast addition to slave territory. Meanwhile, the Oregon Territory remained in the public eye; being clearly destined to be free territory, it was more desirable to the North. For a short while, the government was at an impasse. To proceed with the annexation of either territory would quite possibly lead to war. In one case annexation would be opposed by the North while in the other case it would be opposed by the South; to undertake simultaneous conflict with both England and Mexico would be dangerous and unwarranted. Both issues arose in the electoral campaign of 1844. Unable to agree on a major candidate, the Democratic convention named the first "dark horse" compromise candidate, James Polk of Tennessee, who consolidated some of the discordant elements of his party by attracting the West and South to the prospect of "reoccupying" Oregon and "reannexing" Texas. The Whigs nominated Henry Clay. Polk won because the expansionist policy of the Democrats appealed to both North and South.

THE MEXICAN WAR. Recognizing the popular trend to expansionism, Tyler's Congress decided on the admission of Texas just before he vacated office in 1845. Mexico refused to recognize the annexation, and Polk ordered the army to defend the southern border. A Mexican army crossed the Rio Grande on April 26, 1845. The Mexicans were met by an American army under Gen. Taylor, who defeated them in several battles and won a decisive victory at Buena Vista on



MEXICAN WAR

General Zachary Taylor at the Battle of Buena Vista, 1847

Feb. 23, 1847. Another army, under Gen. Winfield Scott, landed at Veracruz, captured it on March 29, 1847, and pushed rapidly inland to the City of Mexico, which was captured on Sept. 14, 1847. The treaty of peace, signed Feb. 2, 1848, made the Rio Grande the boundary, and ceded New Mexico and California to the U.S.

"FIFTY-FOUR-FORTY." Meanwhile, Oregon had also been taken into the fold. An exponent of forthright measures, Polk decided that the concentration of forces needed for the successful conduct of the Mexican War could not be obtained except by eliminating the relatively minor, but nonetheless irritating and dangerous, dispute over the dual British-American authority in the Northwest. As an incidental result, he hoped to reduce some of the Northern opposition to the Mexican War. Despite the widespread cry of "Fifty-four-forty or fight!" (representing the latitude at which the expansionists wanted the boundary set) Polk offered England a compromise dividing line to be drawn along latitude 49°. England agreed more readily than did some of the staunch "fifty-four-forty" men, but these, too, were persuaded to see the advantage of the bargain.

COMPROMISE OF 1850. In 1849, the Whigs returned to power with Zachary Taylor, hero of the Mexican War. He faced the trying problem of absorbing the newly acquired territories to the satisfaction of North and South when the geographical balance was upset by a curious accident. In January 1848, gold was discovered in the Sacramento Valley of California; almost overnight the area was overrun by scrambling hordes from all over the world. Slave owners had no place in this mad rush of adventurers, but they also had no wish to see the newly acquired lands peopled by Free Soilers and Abolitionists. While Congress tried to delay the question of organizing the California Territory, the "forty-niners"

demanding the right to skip the territorial stage and to be admitted to the Union as a free state.

Henry Clay, the "Great Compromiser," now offered the last of his many settlements. So many disputed matters were balanced out in his proposal, that the law became known as the "Omnibus Bill" of 1850. It provided for the admission of California as a free state, the organization of the territories of New Mexico (recently purchased from Mexico) and Utah, with the slavery issue to be later solved by the settlers themselves on the basis of "Squatter Sovereignty." The Omnibus Bill also abolished the slave trade in the District of Columbia and enacted a more stringent fugitive slave law. The compromise was bitterly opposed by extremists of both sides who were reluctant to make any concessions to the opposition. Daniel Webster, however, reversed his earlier antislavery stand and in his famous "Seventh of March Speech" supported the compromise. Calhoun denounced the bill as endangering the Union. President Taylor also objected to the bill, but his death brought Millard Fillmore to the Presidency, and the latter gave his approval to the measure.

The North, however, refused to cooperate in enforcing the fugitive slave law and even aided the "Underground Railway" to rescue slaves from bondage. Harriet Beecher Stowe's "Uncle Tom's Cabin" (1852) typified Northern resentment against the return of fugitives. Those who hoped that the compromise would prove to be the final settlement had hardly time to celebrate the supposed victory for Union when the question arose again with all the old animosity. By the terms of the Kansas-Nebraska Act of 1854, which was sponsored by Stephen A. Douglas, Democratic Senator from Illinois, Congress provided for the admission of the remainder of the Louisiana Territory on the basis of squatter sovereignty. But in 1820 the Missouri Compro-



TERRITORIAL EXPANSION OF THE UNITED STATES

mise had specifically excluded slavery in the new lands north of $36^{\circ} 30'$, and the Kansas-Nebraska Act was in direct violation of this rule: the North had everything to lose by the new arrangement, and nothing to gain. Meanwhile, the election of 1852 had turned into a landslide for the Democrats; Franklin Pierce reunited his party and started the ineffective Whigs on the road to oblivion. "Bleeding Kansas" became a battleground for the contending parties, each seeking to gain control of the territorial government. Midwestern Free Soilers and slave-owners from Missouri flooded the territory. John Brown, a fanatical Abolitionist from New England, was responsible for the murder of five proslavery men. The slave-owners entered the campaign with equal vigor with their "Kickapoo Rangers" and similar guerrilla bands. Under such conditions Congress could not decide which of the rival factions it would recognize. After the South had seceded, Congress admitted Kansas as a free state in 1861.

Among other things, the Kansas-Nebraska Act convinced even moderate Northerners that no future compromise with slavery was possible. Northern mobs interfered on behalf of runaway slaves to prevent the enforcement of the Fugitive Slave Act.

REPUBLICAN PARTY. With the Whig party hopelessly divided over slavery and the Democrats largely controlled by the South, the antislavery

men began to cast about for a new political vehicle. On July 6, 1854, after the passage of the Kansas-Nebraska Bill, the Republican party was organized combining many antislavery factions—Free Soilers, Northern Whigs, and Anti-Nebraska Democrats. Its platform denounced slavery as a "moral, social, and political evil" and called for the repeal of the Kansas-Nebraska Act and the fugitive slave law. The Republican movement spread quickly through the North. As their first Presidential candidate, the Republicans nominated John C. Frémont, the famous "Pathfinder" of the West, in 1856, on a platform opposing slavery in the territories but not in the states. He polled 1,300,000 votes, 500,000 less than the victorious Democrat, James Buchanan. Just after Buchanan took office, the Supreme Court, under the leadership of Chief Justice Roger B. Taney, who had succeeded John Marshall, issued the famous Dred Scott decision which declared unconstitutional any legislation prohibiting slavery in the territories. Nebraska and Oregon were thus thrown open to slavery as well as the Southern lands. Even squatter sovereignty, a sore enough dose for the Abolitionists, was now canceled. The South was elated, but the Free Soilers of the North attacked the Supreme Court bitterly. Charges were made that the decision was a Southern conspiracy.

Meanwhile, an Illinois lawyer, Abraham Lincoln, obtained the Republican nomination for

the Senate in 1858. He was opposed by the incumbent Democrat, Stephen Douglas, with whom he debated the slavery question. Lincoln asked Douglas whether he favored the Dred Scott decision or the tenets of squatter sovereignty. Douglas stood firm on his original principle of squatter sovereignty to please the North, although he paid lip service to the Dred Scott decision to keep his Southern support. Lincoln rose to national prominence for the brilliant simplicity and eloquence of his arguments. Though Douglas won the Senate seat, he alienated enough Southerners by his so-called Freeport Doctrine to cost him the Presidency in the elections two years later.

The Republicans won the House of Representatives from the Democrats in 1858. Their 1860 platform called for government aid to commerce and business through river and harbor improvements and for the building of a transcontinental railroad with the help of Federal subsidy.

CIVIL WAR. On the eve of the 1860 campaign, John Brown, having transferred his activities from the struggle for Kansas, seized the Federal arsenal at Harper's Ferry, Va., as the first step in a revolution aimed at freeing the slaves. Although roundly condemned by the North and tried and executed by the State of Virginia, to frightened Southerners he now typified everything that was hateful in Abolitionist sentiment. With the Republicans, behind Lincoln, gaining strength, and the Democrats split between the Northern (Douglas) and Southern (Breckinridge) wings, the South vowed to resist by force the election of a "Black Republican." Lincoln was elected, but with only about 40 per cent of the popular vote and largely because of the split in the Democratic party. Without waiting for him to take office, South Carolina adopted an Ordinance of Secession on Dec. 20, 1860. Ten other states soon followed this action and established the Confederate States of America (*q.v.*). Jefferson Davis of Mississippi was elected President and Alexander H. Stephens of Georgia became Vice President of the new government. The Southern authorities immediately prepared for war by seizing valuable stores and blockading Ft. Sumter, in Charleston harbor. President Lincoln declared in his inaugural address, March 4, 1861, that the Southern states had no cause for reasonable apprehension in the election of a Republican administration and took immediate steps to maintain the Union. The first shot of the war was fired by the South against Ft. Sumter on April 12, 1861, and two days later the commanding officer, Maj. Robert Anderson, surrendered to the Confederate Gen. Beauregard but was permitted to sail with his garrison for New York.

Aroused by the fall of Ft. Sumter, Lincoln called for 75,000 volunteers to crush the re-

bellion; the North felt that the conflict would be over in a few months. The four border slave states of Missouri, Kentucky, Maryland, and Delaware remained within the Union and contributed troops to the Northern armies. The North and the South were of about equal area, but the North had a three-to-one advantage in manpower and was vastly superior in material resources. The South had a military tradition, enjoyed the military advantage of fighting on home territory, and possessed more able generals.

The North decided upon a fourfold strategy that included naval blockade; capture of Richmond, capital of the Confederacy; cutting the Confederacy in two by driving down the Mississippi; and pressing southward from Virginia and eastward from the Mississippi to destroy the Confederate armies. At first, the blockade was ineffective because the Union navy was weak and disorganized, but by 1863 it was able to cut the South off from the outside world and to prevent it from shipping its cotton to European mills and from importing much-needed ammunition, clothing, and medical supplies. Throughout the war, however, English-built Confederate commerce raiders preyed on Northern shipping, and Southern blockade-runners exchanged some tobacco and cotton for manufactured goods.

The Union navy captured New Orleans, bottling up Confederate trade on the Mississippi River. In the Mississippi Valley, the Union armies, under the command of Gen. Ulysses S. Grant, won a series of victories which by July 4, 1863, gave the Federal government complete control of the Mississippi River and split Confederate territory in two.

In Virginia, the Union armies met with one defeat after another. The Confederate forces were led by the brilliant Gen. Robert E. Lee and Gen. Thomas J. ("Stonewall") Jackson, and the terrain between Washington and Richmond was admirably suited to defensive warfare. In August 1862 the Confederate forces under Gen. Lee took the offensive and struck north but were fought to a standstill at Antietam in western Maryland. President Lincoln seized on this partial success to issue his Emancipation Proclamation, by which, as of Jan. 1, 1863, all slaves in the Confederate States were declared to be free. In the summer of 1863, Lee moved north again and invaded Pennsylvania, endangering Harrisburg, Philadelphia, and Baltimore. Lee was met by a stronger Union army at Gettysburg, and after a three-day battle the Confederate army had to retreat to the South. This was the high-water mark of the Confederate effort.

By this time, the Union blockade completely ringed the Confederacy and was strangling the economic life of the South. The North expanded its war industries and, with the aid of the reaper,



CIVIL WAR PRESIDENT

Abraham Lincoln with Allan Pinkerton and General John A. McClelland

produced bumper wheat crops. Immigration from Europe swelled Northern manpower. The South was on the verge of defeat. After the Battle of Gettysburg, the Confederate hope of British and French intervention was gone. Early in 1864, Grant came east to take command of all the Union armies and began a relentless campaign to weaken Lee's armies.

In May 1864, Gen. William Tecumseh Sherman, with 100,000 men, starting from Chattanooga, Tenn., captured Atlanta, Ga., and marched "from Atlanta to the sea." They laid waste a strip of land 50 m. wide, destroyed railroads, and finally reached Savannah, splitting the Confederacy in one more place and dealing it a psychological deathblow. Sherman later captured Columbia and Charleston. In the fall of 1864, Gen. Sheridan's troops ravaged the rich farms of the Shenandoah Valley. On April 3, 1865, Grant took Richmond, and six days later Lee surrendered with his exhausted army at Appomattox Court House.

Foreign relations during the Civil War had been complicated because of the open friendship shown by France and England to the Confederacy. Russia alone showed her friendliness to Lincoln by sending her fleet to U.S. waters in a gesture designed to discourage the interference of England.

Unable to make direct payment for this assistance, the U.S. relieved the Czar of his cumbersome and apparently useless American possessions by purchasing Alaska and the Aleutian Islands in 1867. The purchase price of \$7,200,000 so far outstripped the current value of the terri-

tory that the purchase was popularly dubbed "Seward's Folly" by those who were unaware of the nature of the transaction and who blamed Secretary of State Seward for an unwise deal. See *Alaska*.

The Trent Affair nearly provoked war with England when, in 1861, Union warships forcibly removed Confederate Agents Mason and Slidell from the British vessel *Trent*. Over the violent protests of his extremist supporters, Lincoln released the two men to pacify the British. Taking advantage of American preoccupation with the Civil War, Napoleon III of France put the Austrian archduke Maximilian on the Mexican throne, in violation of the Monroe Doctrine as well as the wishes of the Mexican people. The "Indian Lincoln," Benito Juarez, however, overthrew Maximilian with U.S. support. The combined pressure of the U.S. and Germany persuaded Napoleon to withdraw his troops and abandon the archduke to a Mexican firing squad. See *Mexico*.

As part of his policy of peaceful relations with England, Lincoln tempered the claims arising out of the damage caused by the *Alabama* and other Confederate raiders built in English yards. These claims were settled in 1872 by a British reparation of \$15,500,000.

The war settled for all time the question of the supremacy of the Federal government and abolished slavery forever. It destroyed the planter class, bankrupted the South, and saw the emergence of the Northern capitalists and industrialists to a position of dominance. It created a hatred between the North and South which was only

partially abated after the passage of many years. It created new problems—how to make the ex-slaves self-reliant freedmen and put them on the road to political and economic equality, how to deal with the veterans, how to reconstruct the South, how to deal with the new capitalist class.

RECONSTRUCTION. President Lincoln and Congress anticipated the problems involved in bringing the seceded states back into the Union and establishing responsible and loyal governments in these states. In fact, "reconstruction" began to be discussed as early as 1863, although the period involved properly extends from the close of the conflict of arms in 1865 until the withdrawal of the Federal troops from the Southern states in 1877. Lincoln having been assassinated in 1865, the Vice President, Andrew Johnson, became the chief executive. The latter adopted the lenient policy of Lincoln on the issues of reconstruction, but his tactlessness and bad temper estranged him from the Radical Republican majority in Congress. He was impeached in 1868 and subjected to an extended trial before the Senate, where a single vote saved him from conviction. Congress in the meantime proposed the 13th Amendment to the Constitution, abolishing slavery, which was ratified by the requisite number of states in December 1865. In the same year both houses of Congress proposed the 14th Amendment, which, after much discussion, was ratified in July 1868. This provides that all persons born or naturalized in the U.S., and subject to the jurisdiction thereof, shall be deemed to be citizens of the U.S. and the state where they reside.

The reconstruction plans of the Radical Republicans in Congress involved, first, placing the South under military control; secondly, compelling the South to accept the 14th Amendment to the Constitution, which guaranteed the ex-slaves equal rights, and the 15th Amendment, which gave the freedmen the right to vote; and finally, setting up state governments in the South which would be controlled by the Radical Republicans with the help of Northern adventurers ("carpetbaggers"), freedmen, and poor whites.

The "carpetbagger" governments were generally incompetent, wasteful, and corrupt. The Southern whites, after recovering from the shock of defeat, began reasserting themselves gradually. The Ku Klux Klan, a secret organization, was organized to intimidate Negro voters and to drive out the Northern carpetbaggers. The Democratic party was reorganized and gained control of one state government after another. By 1876 only three Southern states were still held by the carpetbagger governments, which were protected by Federal troops. In 1877 President Rutherford B. Hayes, as part of a compromise that had brought him the Presidency in the disputed election of the year before, removed the troops from the

South. The remaining carpetbagger governments quickly collapsed, and this marked the end of the "radical" reconstruction program.

NATIONAL ECONOMIC DEVELOPMENT. The South emerged from the Civil War with its industries destroyed, its cities damaged, its farmlands ruined by the fighting and by neglect. Political, social, educational, and cultural institutions were wrecked. But the task of physical reconstruction and the reorganization of agriculture was attacked with vigor. The ravages of war on the farms, in the factories, in the cities, were repaired as quickly as manpower and resources would permit. Southern pine became the basis of a lumber industry; tobacco manufactures flourished in North Carolina. Coal and iron deposits in Tennessee and Alabama made Birmingham and other Southern cities manufacturing and railroad centers. The Southern textile industry revived in the 1870's.

The plantation system was replaced by sharecropping, but this proved to be wasteful both of men and soil, and marked a step backward in the South's economic progress. The Negroes returned to farming for the most part, now as sharecroppers, and their economic condition was little improved as compared to the pre-Civil War days. A few drifted into industrial centers.

In the North the war had given a great impetus to industry and finance. The Republican party, carrying out its program of aid to business, passed (1861) the Morrill Tariff Act, which was frankly designed to protect American industry from foreign competition. Succeeding tariff laws raised the rates higher and higher. Railroad construction was subsidized with \$60,000,000 in loans and over 100,000,000 acres of the public domain. Between 1860 and 1870 the value of manufactures increased 100 per cent.

The National Banking Acts of 1863-64 created a strong banking system as an aid to investors. The government's policy to cease issuing "greenbacks," or paper money, when the Civil War ended and to redeem government bonds in gold, favored creditors and investors again. Debtors, farmers, and workers, however, lost heavily by this decision.

The great industrial and financial fortunes were founded in the post-Civil War era—Morgan, in banking, Carnegie in steel, Rockefeller in oil, Swift and Armour in meat packing, Vanderbilt, Harriman and Hill in railroads.

The agricultural conquest of the West after 1860 was spurred on by the demands of the Union armies, the industrial populations of the North and of foreign countries. The Homestead Act, passed during the Civil War, gave 160 acres of public land free to any one who would cultivate it for five years. Railroads extended the area of profitable farming farther and farther west. Agri-

cultural machinery—harvesters, mowers, twine binders, and improved plows—all helped to break the virgin soil and to bring in record-breaking crops of wheat and corn. The farmers, however, did not benefit as much as the industrialists by the nation's economic growth. The banks took advantage of their need for capital to purchase land and machinery, saddling them with heavy interest payments. The railroads manipulated freight rates. Overexpansion often meant overproduction of grain and meats in relation to market prices. In periods when the prices of farm products fell, farmers often went bankrupt. As a debtor class the farmers suffered disproportionately from the effects of a depressed currency and their need for "cheap" money was destined to become the keystone of political agitation in the post-Civil War years.

The workers in mills, mines, and factories gained least from the industrial expansion. During the Civil War prices rose faster than wages. Competition for jobs from war veterans and from immigrants complicated the workingman's problems. Efforts were made as early as the 1860's to unite workers into trade unions such as the National Labor Union and the Knights of Labor, but they met with scanty success.

Two factors were outstanding in American industrial development after the Civil War: the growth of the steel industry, basic to so much general growth; and the growth of the railroad system, so necessary for the settlement of the country and the creation of a national market. There had been an iron industry in the U.S. even in the earliest colonial days. It was not until the great iron-ore deposits were discovered in the Great Lakes area in the 1870's, 1880's and 1890's, and the introduction of the Bessemer process of making steel in the Civil War days, that the basis was established for the gigantic American steel industry. Coupled with a tremendous home market and a protective tariff, these conditions enabled American iron and steel production to gain first place in the world by 1890, a position which it has held ever since. It enabled the U.S. to outstrip all previous records in industrial production and in 1901 steel was the basis for the creation of the first \$1,000,000,000 company—the U.S. Steel Corp.

Paralleling the growth of large-scale industry was the consolidation of the nation's railroads. The pre-Civil War railroads had not been built with any thought of a comprehensive transportation system. Immediately before the Civil War, Cornelius Vanderbilt led the way in a movement to unify small, isolated, competing lines into trunk lines, by creating the N.Y. Central Railroad between New York and Buffalo. By 1875 there were five railroads connecting New York and Chicago. Meanwhile railroad construction

was binding together the West Coast and the rest of the country. In 1869 the Union Pacific and Central Pacific lines were completed, making it possible for the first time to travel to California by train from the East Coast. In the next few decades the Southern Pacific, Northern Pacific, and Great Northern R.R.'s, among others, were added to the transcontinental railroad network. Feeder lines reached out into all sections of the country. By 1910 the railroad network was virtually completed.

The American merchant marine declined, however, after 1850. Up to that time American superiority in the design, construction, and operation of packet boats and clipper ships gave it an outstanding position in ocean transportation. The superiority the U.S. enjoyed in the days of wood and sail was lost when the iron boat and steam propulsion were adopted on a widening scale; Great Britain then took the lead. American energies were directed toward the internal development of the nation. Greater profits were to be had in manufacturing, mining, or railroad construction than in ocean transportation. Under these circumstances the American merchant marine declined, never to regain its important position until under the pressure of World War II the U.S. created a great ocean fleet of merchant ships almost overnight.

In the years following the victory at Appomattox the Supreme Court played an important part in creating the atmosphere of *laissez faire* in which industrialism flourished so mightily. In the 1880's and 1890's the 14th Amendment was transformed by the Supreme Court into a weapon to protect property rather than human rights; corporations were declared to be "persons" within the meaning of the 14th Amendment and were entitled to protection by "due process of the law." By this means corporations were protected from state regulation. For many years after the Sherman Anti-Trust Act was passed, Supreme Court decisions emasculated the law and made prosecution of trusts and actions in restraint of trade ineffective.

CHEAP MONEY. During the Civil War, the government had issued nearly half a billion dollars in "Greenbacks" or *fiat money*, i.e., bills secured only by faith in the government. The Resumption Act of 1875 provided a fund of \$100,000,000 in gold with which the Treasury was authorized to repurchase Greenbacks. Reflecting the farmers' need for cheap money, the Greenback party, organized on a national scale in 1876 to counter this movement, fought for the issuance of more currency rather than the withdrawal of that already in circulation.

The discovery of silver in the West contributed to the battle over currency. Until 1873 the government had coined silver and gold equally at an approximate ratio of 16 to 1. Gold, however,

continued to flow in from the newly opened mines, and silver remained relatively scarce, causing the ratio of the metals to change in the open market. Since silversmiths were offering a higher price for the metal than the Treasury, very little found its way into the money market. It was of small importance to anyone, therefore, when Congress discontinued the coinage of silver in 1873. The inflationists kept their eyes on the Greenback until the accidental discovery of new silver deposits opened the floodgates of a deep-seated political storm. The almost ignored act of Congress became known as the "Crime of '73" and silver producers demanded that the government resume its purchase at the old rate which was now far more favorable than the reduced open market value. The debtor classes, mostly of the West and South, joined the silver producers in the demand for unlimited coinage. Congress made a partial concession in 1878 with the passage of the Bland-Allison Act which authorized the resumption of limited coinage. In the same year Congress forbade the further retirement of paper money.

These measures, however, fell short of their goal. The price of silver continued to drop, and Congress increased its purchases, paying for the metal with Treasury notes, which soon declined in value. This inflation reduced the value of gold, driving most of that metal out of circulation or out of the country.

NATIONAL POLITICS. Very little of importance in politics occurred during these eventful years. The Republican party maintained control of the national government until 1912, interrupted only by the Democratic administrations of Grover Cleveland from 1884-88 and 1892-96. Its policies were concerned with the support of business and industry and the political domination of the Southern states in order to perpetuate itself in power. The latter policy solidified the South behind the Democratic party once the Federal troops withdrew. Although this policy failed, the program of aid to business succeeded, and proved to be the mainstay of its strength.

General Grant was elected President in 1868 and although his administration started out with great promise it proved to be one of the most corrupt and inefficient in American history. It was marred by serious scandals connecting Congressmen with crooked promoters of the construction of the Union Pacific R.R., fraud and theft in government departments, and a general lowering of public morals. State and city politics were dominated by political freebooters, such as the notorious "Tweed Ring" in New York City. In 1876 Rutherford B. Hayes was elected President over his Democratic rival, Samuel J. Tilden. The disputed election was referred to a special Electoral Commission, although Tilden had

polled 250,000 more popular votes than his rival. The administrations of Hayes and his Republican successors, James A. Garfield and Chester A. Arthur, Benjamin Harrison and William McKinley, were devoid of important accomplishments.

Grover Cleveland broke the Republican grip on the Presidency with his victory in the election of 1884 and became the first Democrat to occupy the White House since Buchanan. His first term was marked by administrative reforms and a war against corruption and special privilege. But little of a constructive nature was accomplished in economic and social matters except tariff reduction. Cleveland was as firm a believer in *laissez faire* as the Republicans. Cleveland was defeated for re-election by Harrison, but in turn he defeated Harrison in the election of 1892. Hard times troubled the country during all of Cleveland's second term, but he opposed governmental intervention and depended on natural forces to bring back prosperity. At the end of his second administration the Democratic party was split wide apart because of Southern and Western opposition to Cleveland's anti-inflation stand.

Political "machines" controlled many of the great industrial states, and "Boss" Platt of New York, and Mark Hanna of Ohio had great influence in Washington, as well as in their own state capitals. Their only philosophy was to enrich themselves, to reward their followers, and to serve the interests of the great corporations.

GOVERNMENT AND BUSINESS. In the years after the Civil War the economic doctrine of *laissez faire*, inherited from the English Industrial Revolution, governed the relations of business and government. The phrase signified the belief that private enterprise should be allowed to take its "natural" course without interference from the state. "Self-interest" inevitably led to trusts and monopolies. Beginning with the Civil War and continuing with great rapidity in the 1880's, one industry after another was organized into pools and, later, trusts to control competition and prices. The competition for profit resulted in overproduction. Competition became intense and the only way out was through consolidation. Trusts came to mean any large combination in business. Starting with the Standard Oil Co. monopoly under the guidance of John D. Rockefeller, they spread to the steel, rubber, tobacco, match, sugar, meat, copper, and numerous other manufacturing and mining industries. The nation's telegraph lines were monopolized by Western Union; telephones by American Telephone & Telegraph. The country's railroad network was consolidated into Vanderbilt, Gould, Harriman, Hill, and Morgan "systems." Capping the structure was the Morgan "money trust" whose influence was felt in railroad systems, the steel, harvester, and electrical industries, shipping lines, the American



ERA OF INVENTIONS

Alexander Graham Bell inaugurating telephone service between New York and Chicago in 1892. The telephone was only one of the many notable inventions made in the U.S. during the 19th century

Telephone & Telegraph Co., and many public utilities.

By centralization, more efficient production was achieved and cutthroat competition was eliminated, but at what cost? The economic resources of the nation were concentrated in a few hands and were exploited for their benefit rather than for the good of society. Small businesses were driven to the wall, labor was oppressed, farmers were mulcted, investors were often swindled, and governments were bribed and corrupted.

The outcry against trusts gained force in the 1880's as they grew in power and engulfed large sections of the economy. The railroad combinations were the first to be regulated. In the 1870's the Western farmers were beginning to agitate against the malpractices of the railroads—exorbitant freight rates, poor service, and speculation in land. Pressure from farm organizations resulted in the passage of laws in the Midwestern states regulating railroads. When the Supreme Court ruled that, while states could regulate railroads within their own boundaries, only the Federal government could regulate railroads engaged in interstate commerce, Congress passed the Interstate Commerce Act of 1887. It prohibited discrimination in rates or services, rebates, and other bad practices. It also created the Interstate Commerce Commission to administer the law, the first of the governmental regulatory agencies. Though weak at first, the Interstate Commerce Act was strengthened later by the Elkins Act of 1903 and the Hepburn Act of 1906.

UNITED STATES

In 1890 the more complicated problem of regulating industrial trusts was tackled when the Sherman Act was passed. By its terms all monopolies and combinations in restraint of trade were forbidden. This law, too, was very weak, partly because the courts usually ruled in favor of the trusts when the government cited them under the Sherman Act. The consolidation of industry continued uninterrupted.

But if the Interstate Commerce and Sherman Acts did not halt the movement toward consolidation, they did establish the legal premises for government regulation of private industry; an aroused public opinion refused to let it rest there. The end of the 19th and beginning of the 20th centuries were marked by acrimonious public debates on the subject of corporate control; journalists of the period awakened suddenly to the social responsibility of the government and the need for legislation to protect the public against the vast accumulations of capital. Writers such as Thomas Lawson, Charles Edward Russell, and Ida Tarbell tore the veil of secrecy from the bleakest and most distressing side of American industrial life. This unrelenting criticism that spared no harsh detail was given the name of *muckraking*, and it stimulated a wave of popular indignation that stirred the government to action. For all his contempt for the undignified exposés of the muckrakers, President Theodore Roosevelt became known as a "Trust Buster" and created several new technical restrictions on the unbridled corporations. Under his administration, Congress created the Department of Commerce and Labor (1903), with powers of investigation and publicity, exercised by the Bureau of Corporations. It supplied the Attorney General with material for prosecutions. Despite some spectacular court victories which resulted in dissolution orders for the meat-packing and tobacco trusts, the Standard Oil Co., and a railroad combination sponsored by Morgan, Harriman, and Hill, Theodore Roosevelt's trust-busting activities were unsuccessful. The antitrust laws were not strengthened, and the trust found ways of evading the orders of the courts. They were stronger than ever when Roosevelt's administration ended.

The Supreme Court's "Rule of Reason," however, vitiated some of the effects of the antitrust legislation by limiting prosecution to cases of "unreasonable" restraint of trade; several of the larger corporations were obliged to reorganize and issue new stock, but corporate consolidation continued much the same as before.

Government regulation of business through the first decade of this century was ineffective. Congress left loopholes in every law, yet in the process of scraping through each one, some of the more flagrant abuses of big business were pared off.

To an aroused public, a law that brought no improvement at all would act only as a political irritant; every measure, therefore, had to accomplish something. With all the evasions, a new attitude of responsibility began to develop. Corporation leaders were beginning to understand that only if they corrected their worst abuses would their enterprises be allowed to survive.

THE LABOR MOVEMENT. Big business and the industrial development of the country, whatever they may have accomplished, did little if anything to improve the status of the workingman. Despite the marvelous productivity made possible by mechanization, he still was working long hours, under bad working conditions, was earning little money, was living in slums, and was constantly threatened with unemployment because of depressions or the loss of his job to an immigrant or a Southern worker who was willing to work for still lower wages. With the disappearance of cheap lands at the end of the 19th century, the farm as an alternative to the factory was no longer feasible. Twenty million immigrants poured into the country in the 40 years after 1870, crowded into the industrial cities, and threatened wage standards and trade-union organizations. To complicate the workers' problem in their efforts to improve their lot, the Sherman Anti-Trust Act was applied against trade unions more often than against industrial trusts.

The feeble attempts which were made to found trade unions in the years immediately following the Civil War were followed by more potent labor organizations in the 1880's. The Knights of Labor, revived in 1879 under the leadership of Terence V. Powderly, Grand Master Workman, after 10 years of little progress, attempted to organize workers of all trades and all skills and to improve the status of the worker through political action, education, and the establishment of co-operatives. They favored the eight-hour day, abolition of child labor, income and inheritance taxes, and public ownership of utilities. When peaceful methods failed to achieve their program, the Knights of Labor resorted to strikes after 1885. Membership rose to 700,000. A general strike was organized to achieve the eight-hour day. When this strike and several others failed the Knights began to decline. Organizational weaknesses and an alliance with the Populist party in 1892 hastened the process.

In 1886 the American Federation of Labor was organized by Samuel Gompers, son of a Dutch cigarmaker who had emigrated to the U.S. The federation was composed of self-governing craft unions, and it appealed to the skilled workers. It rejected utopian ideals and fought for short-term opportunistic objectives—higher wages and shorter hours. A strong, well-financed organiza-

tion was developed which could conduct strikes where necessary, fight for improved labor legislation, and appeal to the public because of its conservative policies.

The 1880's, 1890's, and early 1900's were marked by violent conflicts and thousands of strikes—the railroad strike of 1877, the Haymarket riot in 1886, the Homestead Strike in 1892, the Pullman Strike in 1894, the Colorado coal-field strikes, and the anthracite strike in 1902—to win for labor the basic rights of organization, collective bargaining, and the use of the strike as a weapon. But labor's campaign to improve its working conditions and its mode of living progressed more slowly. The government's aid was necessary to abolish child labor and excessive working hours, especially for women; to provide for aid when workers were injured on the job; and to establish a factory inspection system. The achievement of these objectives was a slow and painful process, since the legislatures of 48 states had to be prodded into action and since the progressive labor laws of one state drove industry into the less advanced states.

IMMIGRATION. The promise of the New World had always been a powerful lure to attract immigrants from Europe. Until the 1890's most immigrants came from England, Ireland, and Germany. Thereafter immigrants from Italy, Austria-Hungary, Russia, and Poland began to increase. By 1910, the "new immigration," as it was called, constituted four-fifths of the total. The "old immigration" had gone to the West as well as to the North, and had settled on farms and in factory towns. The "new immigration" was concentrated in the industrial centers of the East and Middle West. Beginning about 1900 agitation for the restriction of the immigrant flood became widespread. Congress had already halted Chinese immigration in 1882, and had excluded certain undesirables, such as diseased persons, mental defectives, and anarchists. The device of the literacy test was seized on as a method which would not only reduce the number of immigrants but would bar immigrants from Russia, Poland, and Italy where illiteracy was high. This would increase the ratio of "old immigrants," who were thought to be easier to assimilate. The literacy test was vetoed by Cleveland, Taft, and Wilson. Finally, however, Congress in a series of laws beginning in 1921 restricted the total number of immigrants to be admitted in any year. By 1929 this number was 150,000 per year. Canadian, Mexican, and South-American immigration was not affected by this limitation, but strict interpretation of other restrictions reduced immigration from these countries too.

THE REVOLT OF THE FARMERS. The difficulties of the farmers were many—overproduction, low

prices, exploitation by railroads, banks, and speculators—and they all pointed to organization as the way out. But obstacles in the way of any farm organization were numerous as well. The farmers were scattered; they competed against each other; they were individualists. In 1866, however, Oliver Kelley founded the Patrons of Husbandry to improve the social and cultural position of the farmer. After a slow start the movement gained impetus when it concentrated its efforts in the Middle West and when the hard times of the 1870's set in. "Granges," as the local units were called, spread to most states, and membership rose to 750,000. Kelley's objective—to break down the social isolation of the farmers and to bring them together in monthly meetings where they would benefit by social and cultural activities—were realized. But the Granges soon began discussing economic problems and politics too. Co-operatives were organized to save the farmers money in buying and selling, though many of them failed through bad management and the hostility of business interests. The Grangers succeeded in having Mid-Western legislatures pass laws regulating railroads and warehouses. In the late 1870's, however, the Granger movement died out as prosperous times returned, as their business enterprises failed, and as the Granger laws failed to achieve their objectives.

During the depression of the late 1880's and the early 1890's the Farmers' Alliances arose to champion the farmer's cause and by 1890 they had 2,000,000 members. Unlike the Grangers, however, they ventured into politics, and emerged as the Populist party, which in addition to farmers had trade unionists, socialists, silverites, and other groups in its ranks. Backed by tremendous enthusiasm, the Populists won control of several Western and Southern states in 1890 and elected many members of Congress. In 1892 they nominated James B. Weaver for President, and polled over 1,000,000 votes.

Meanwhile, the Democratic party split, the Western and Southern branches breaking with the conservative leadership of President Cleveland, and began a fight to take control of the party away from him. The issue was cheap money to be achieved by free and unlimited coinage of silver. They succeeded in nominating their candidate, William Jennings Bryan, as the Democratic candidate, and completed their capture of the Democratic party by writing the platform. The Populists joined forces with them. The conservative wing of the Democratic party refused to support Bryan and many deserted to the Republican camp. The Republicans nominated William McKinley and under the leadership of Mark Hanna raised a tremendous campaign fund. Despite one of the most remarkable campaigns in American history, Bryan lost the election by

more than 500,000 votes. But the reforms for which he fought ultimately won acceptance and profoundly affected American life.

THE PROGRESSIVE ERA. From 1896 to the end of World War I, political machinery and ideas, economic institutions, and social conditions were all subjected to penetrating analysis and to some important changes. The Western agrarian reformers like William Jennings Bryan and Robert M. La Follette were joined by Eastern intellectuals such as President Charles W. Eliot of Harvard University, and prominent political figures like Theodore Roosevelt and Woodrow Wilson. Reformers fought to end the evil of the slums, poverty, crime, and ignorance. Political machinery was made more democratic by the introduction of the initiative and the referendum, the direct primary, the secret ballot, direct election of senators, women's suffrage, and municipal home rule. The corrupt state and big-city political machines were fought. Wisconsin, under the inspiration of La Follette, led the way in progressive political, economic, and social legislation.

In the Presidential election of 1900, Bryan and McKinley were opponents once again. The times were good and Bryan's opposition to imperialism did not arouse the electorate. McKinley, the safe and sane candidate, was re-elected and the conservative Republican program was triumphant again.

In September of 1901, McKinley was assassinated and the Presidency went to Theodore Roosevelt, the Vice President. The progressive movement now had a national leader—a man of extraordinary energy, enthusiasm, and ability to capture the imagination of the country. Roosevelt shook the "big stick" against the "malefactors of great wealth." While, as has already been seen, his campaign against the great trusts did not achieve any lasting results, his efforts to strengthen the regulation of railroads bore fruit. The Interstate Commerce Commission's jurisdiction was extended to pipelines, express companies, and storage and terminal facilities. It was given real authority to regulate rates. Railroads were forced to withdraw their representatives from the directorates of steamship lines and coal companies. In 1906, pure-food and drug laws were passed, the first attempt to end the evil practices of meat packers and food and drug manufacturers which had been dramatized so vividly by Upton Sinclair in his novel about the Chicago meat packers, "The Jungle."

Roosevelt's most important and lasting contribution to national welfare was his leadership in the conservation movement. He set aside 150,000,000 acres of land as a forest reserve and created a vigorous and progressive forest conservation administration. The Reclamation Act of 1902 provided for large-scale irrigation works to

be financed and supervised by the Federal government. Several dams were built, but more important was the establishment of the principle and its acceptance by the country. Theodore Roosevelt's conservation work was to be carried out on a much greater scale in the "New Deal" days of President Franklin D. Roosevelt.

In 1904 Roosevelt was easily re-elected over the Democratic candidate, Judge Alton B. Parker. Roosevelt could have demanded and gotten the nomination in 1908, and probably would have been re-elected since he stood high in popular esteem. Instead, he designated William Howard Taft, Secretary of War in his cabinet, and a close associate, to succeed him. Taft easily defeated Bryan, who made his third and last bid for the Presidency.

Taft's administration, though marked by several important accomplishments, was a failure. The Interstate Commerce Commission was strengthened, the Constitution was amended to allow the direct election of senators and the imposition of an income tax. The civil service was extended; prosecution of trusts was intensified. But Taft's alliance with the extreme right wing of the Republican party and his acceptance of a new tariff bill with prohibitive protective rates aroused public opinion against him. La Follette and other progressives tried to interest Roosevelt into running against Taft in 1912, but he hesitated. After La Follette had begun working to win the Republican nomination for himself, Roosevelt entered the campaign. Unsuccessful against Taft's party machine, Roosevelt organized the "Bull Moose" Progressive party in his bid for a third term. The Democrats named Woodrow Wilson, governor of New Jersey, and a former professor of political science. In the three-way contest Taft and Roosevelt split the Republican vote, and Wilson was elected, but with only a little over 40 per cent of the electorate behind him.

SPANISH-AMERICAN WAR. Thus America graduated from the adolescence of industrialization, suffering the awkwardness, the growing pains and the conflicts, but emerging as a mature and fully developed nation. Nor was this growth directed into a single channel; as industry became consolidated under the direction of the masters of finance, a collateral development took place in international affairs. In Washington's time, all intelligent observers could agree on the policy of avoiding foreign entanglements; by the time of Monroe, the proper sphere of U.S. interest had been extended to include the entire Western Hemisphere; Polk established the continental borders of the nation and discovered the "manifest destiny" of a people to govern an empire; Lincoln found Mexico's Juarez deserving of aid, the more so as he wanted to uproot Napoleon III from North America. In a broad sense, these

attitudes toward imperialist expansion reflected the need for security within which the nation could grow and realize its potentialities; they were primarily defensive and aimed at preventing foreign interference. But as the U.S. became an industrial nation, capable of producing almost unlimited quantities of goods, there arose the entirely new problem of finding additional markets and sources of raw materials. Cuba, near the American mainland, offered splendid opportunities in both directions; by 1896, over \$50,000,000 of U.S. capital was invested in the island, but the investment was rendered precarious by the continual unrest and rebellion of the people against the arbitrary and inefficient Spanish government of the country. The last such revolt broke out in 1895, and Spain's ruthless measures of suppression created great sympathy for the insurrectionists in this country. When the U.S. battleship *Maine* was sunk in Havana harbor by an explosion (Feb. 15, 1898) it was generally assumed, although never proved, that the Spaniards were responsible. Congress passed a bill on April 25 declaring that a state of war existed between the U.S. and Spain. The short and decisive contest, which lasted 10 weeks, was one of unchecked successes. Commodore Dewey destroyed the Spanish fleet in Manila Bay, in the Philippines, and Commodore Schley "bottled up" the Spanish fleet under command of Adm. Cervera, in Santiago harbor. Cervera made a well-directed effort to escape from the harbor into the open sea, but the American fleet captured or destroyed every Spanish vessel. The American army compelled the capitulation of the Spanish at Santiago, which was surrendered on July 17. Peace was concluded by the Treaty of Paris on Dec. 10, 1898, which ceded Puerto Rico, Guam, and the Philippines to the U.S. and recognized the right of Cuba to establish an independent government. The U.S. paid Spain \$20,000,000 in consideration of the latter country relinquishing its claims to the Philippines.

A large group in the Philippines was hostile to American annexation, and an independent government was established by the insurgent Filipinos on June 12, 1898, with Emilio Aguinaldo as president. Hostilities between the American troops and the insurgents lasted for three years, and involved over 60,000 soldiers. Not until Aguinaldo was captured in 1901 did hostilities end.

"DOLLAR DIPLOMACY." America's need for empire was a relatively late and, in many ways, an ill-timed development. It met with considerable opposition both at home and abroad. As a protective link to the new Pacific islands, Hawaii was annexed in 1898, and part of Samoa was absorbed two years later. These territories, however, were either independent or weakly pro-



SPANISH-AMERICAN WAR

President McKinley signing the ultimatum to Spain, 1898

tected by the tottering Spanish throne, and their acquisition presented little danger. An intensive propaganda campaign by the "jingo press" of Pulitzer and Hearst gave some moral justification for the use of force, but fell far short of winning popular confidence. Moreover, Spain and the backward islanders proved easy foes, but what would have happened had our imperialist ventures led to a major war? The people had hardly finished building a nation where men could live in freedom; for all the manifest economic injustice, they believed sincerely in the political equality of all. The popular mind could see no virtue in subjecting other peoples to foreign rule, even though it might be our own; to fight a war for such a cause would not excite mass support.

Did that mean, however, that our merchants, manufacturers, and financiers must relinquish all hope of exploiting other undeveloped regions? This was the problem that came before the makers of America's foreign policy in the closing years of the 19th century. In 1895, Japan defeated China in a war for the control of Korea; almost immediately, England, Germany, France and Russia attempted to exploit China's proved weakness by partitioning that country into exclusive spheres of influence. At this juncture, the U.S. came on the scene with the acquisition of the Philippines and the resultant expectation of a large Far-Eastern trade. This prospect was clouded by the unwillingness of the entrenched powers to share their spheres of influence. In 1899, Secretary of State Hay obtained an agreement with the interested nations that they jointly respect China's territorial integrity, and that all nations be given equal trade advantages in accordance with the principle of the "Open Door." President Theodore Roosevelt continued this policy in a still more forceful manner. When the Russo-Japanese War of 1904-05 threatened to in-

volve England and France in a general partitioning of China, he published an unmistakable warning that an extension of the conflict would involve the U.S. on the side of Japan. After having thus localized the war, he helped to terminate it by arranging the conference at Portsmouth, N.H., where the terms of the peace were negotiated.

With the U.S. becoming involved financially and politically on both sides of the world, it became more awkward than ever to route ocean vessels around the distant tip of South America. The need for an interoceanic canal had long been recognized, and interest had been stimulated by the success of the Suez Canal that served a corresponding purpose at the opposite side of the world. In 1876, a French company purchased the right to build a canal across the Isthmus of Panama, then a province of Colombia. DeLesseps, builder of the Suez Canal, was put in charge of the project, but proved unable to overcome the peculiar tropical conditions that interfered with the construction. By 1889 the French interests were forced into bankruptcy; a new corporation was formed for the purpose of selling the franchise to the U.S. Having decided upon the purchase, the Roosevelt administration entered into negotiations with the Colombian government, and in 1903 the Hay-Herran agreement was worked out by the diplomatic representatives of the two countries. The Colombian senate, however, was dissatisfied with its terms and refused to ratify the compact. The French company had foreseen this eventuality. In combination with a group of U.S. financiers interested in completing the sale, they instigated a rebellion in the province of Panama that severed that country's ties with Colombia. American warships blockaded the coast to prevent the landing of Colombian troops, and a few days later the new Panamanian government ratified the Hay-Bunau-Varilla Treaty

which transferred the French franchise to the U.S. and created the 10-mile-wide strip, known as the Canal Zone (*q.v.*), through which the two oceans were finally joined. See also *Panama Canal*.

For the next decade, Latin America remained the center of direct U.S. intervention. In 1905, U.S. officials assumed control of the finances of Santo Domingo; two years later our forces intervened to quell the internal disorders of Nicaragua.

The logic of intervention was clear to every one, but failed to win universal support. The government's policy of chaperoning property abroad was given the derogatory name of "Dollar Diplomacy," and aroused much popular resentment. In the public mind it was generally associated with the Republican party, since Presidents McKinley, Roosevelt, and Taft had pursued this course. Woodrow Wilson, elected in 1912 on the Democratic ticket, attempted to reverse the course of dollar diplomacy. He saw clearly how local incidents could lead ultimately to worldwide conflicts; the pattern of European expansion was already laying the seeds of war among the powers of the world. Just before Wilson took office, the Chinese revolution unseated the Manchu dynasty, and the newly installed republican government appealed to the great nations of the world for financial assistance. A loan was arranged by private financiers of six countries, including the U.S. The terms of the loan were such that these countries would gain complete financial mastery of China. The loan had not yet been completed when Wilson came to power. He frowned upon the project, and made clear that U.S. troops would not be used to guarantee the investments. As a result, the American bankers withdrew from the syndicate.

Turning to Mexico, Wilson found himself confronted by another situation of a difficult nature. In 1911, the 35-year tyrannical rule of Porfirio Díaz came to an end when he was overthrown by middle-class and peon forces who then made Francisco Madero, a liberal, the president. Two years later Madero was overthrown and assassinated by counter-revolutionary forces who put their leader, Victoriano Huerta, into power. The American and European mining, railroad, and oil interests, hoping for a restoration of their special privileges as in the days of Díaz, pressed for American recognition of the new regime, since most European governments had already done so. Wilson was unwilling either to recognize the Huerta regime or to intervene in favor of his rivals. He therefore adopted a policy of "watchful waiting." The failure of this moderate system seemed to prove the advantages of the direct methods used by the dollar diplomats. After a number of American sailors had been arrested in Mexico, Wilson ordered

naval units to occupy the port of Vera Cruz (1914). Huerta finally resigned in the face of concerted economic pressure by the U.S. and the leading South-American nations, but factional strife continued. In 1916 a group of political outlaws under Pancho Villa made forays across the Rio Grande; Wilson replied by ordering Gen. John J. Pershing to pursue Villa's band, thus finding himself involved in the same distasteful maneuvers that had characterized the Roosevelt and Taft administrations. Wilson, however, did not use the expedition as a pretext for complete occupation. Pershing's forces were withdrawn within a year even though Villa was still at large in the mountains.

"THE NEW FREEDOM." Since both Wilson and Roosevelt had campaigned against the conservative control of big business, and Eugene V. Debs, candidate of the Socialist party, had polled an additional million votes in the election of 1912, the people's verdict was obviously in favor of a more progressive administration that would restore some of the privileges of the common man and restrain the power of concentrated capital. Under these circumstances, Wilson introduced the "New Freedom."

In 1912 the major issues that divided the conservatives and the progressives were surprisingly like those which had disturbed the nation 100 years before. The high protective tariff no longer shielded infant industries but rather the powerful combines, obliging workers and farmers to pay higher prices in a noncompetitive market. The financial interests were also opposed to any tampering with the money structure, although, as in the "Bankers' Panic" of 1907, they were the first to suffer from an inelastic and expensive currency. As opposed to the agrarian demand for easy credits, however, the bankers remained solidly in favor of sound and well-secured money. In his inaugural address, Wilson outlined these issues as the major problems of his first administration, and under his guidance Congress passed the Underwood Tariff of 1913 which sharply reduced the imposts on about a thousand items and added many to the list of goods that could be imported duty-free.

The Underwood Tariff cut down revenues, but these were more than replaced by a tax on incomes.

Reform of the banking system took the form of the Federal Reserve System which, entirely under government control, provided for an elastic currency which would expand and contract in direct relation to the activity of the money market.

Having accomplished these prime aims, Wilson turned toward the deeper problem of regulating business. A survey made at the opening of his administration showed that the banking interests controlled by Morgan and Rockefeller exercised

a large share in the management of 112 key corporations with resources of over \$22,000,000,000. Wilson believed this concentration of power dangerous to the national welfare and a deterrent to economic freedom. He proposed to Congress a program of legislation, part of which emerged as the Clayton Anti-Trust Act and the Federal Trade Commission Act. The first of these attempted to accomplish what the Sherman Act had failed to do in 1890; it established clear definitions of trusts and interlocking directorates, and made officers of corporations personally responsible for violations. Labor unions were specifically exempted from the category of "combinations in restraint of trade," and an attempt was made to discourage court injunctions in labor disputes. The Federal Trade Commission Act created a nonpartisan body with the power to investigate the structure and operations of corporations and restrain these corporations from unfair business practices.

To relieve the farm population of their most pressing debts, Wilson enacted the Federal Farm Loan Act of 1916 which stimulated private loans on more favorable terms. Other notable reform legislation of the period included a law which barred the products of child labor from interstate commerce and the Adamson Act which established the eight-hour working day on all interstate railroads.

The fact that Woodrow Wilson turned out to be an astute political leader no doubt came as a surprise to many people who knew his history. He was one of the few scholars to hold the office of President, and his time had been largely devoted to theoretical examination of the problems of government. Even his service as governor of New Jersey had seemed to many to be little more than a demonstration of his belief in the unifying function of executive leadership. But his theory had worked. He came to the Presidency with a firm conviction that it was within his power to guide the organs of government into liberal and beneficent channels; legislative opposition, where it existed, was but one of the barriers that the Executive had to overcome.

WORLD WAR I. A war in Europe had been in the making for many years, and when Wilson took office it was already clear that the powerful alliances held the lid but weakly on the seething cauldron. When war finally broke out in 1914, the U.S. became the greatest of the neutral powers; after Italy and Japan joined the Allies, the U.S. was the only important nation not directly involved. This role was, in many ways, harder to bear than one of active belligerence. The American population included representatives of all the participating nations, and these reflected the European dissensions, although, as a whole, the people favored the Allied cause.

Moreover, our industry was quickly geared to the production of munitions on a wartime scale, and, despite his repeated proclamations of neutrality, Wilson was unable to halt the trade in armaments without producing an industrial collapse. Since the Allied, especially the English, blockade of the continent made trading with the Central Powers unprofitable, the bulk of American supplies was directed to the Allies. In retaliation, the Germans adopted a policy of unrestricted submarine warfare that destroyed many ships and cost many lives. On May 17, 1915, over 100 Americans were lost when the British liner *Lusitania* was sunk. Wilson entered a strong protest. His Secretary of State, William Jennings Bryan, unable to retard American economic participation in the European conflict, resigned in 1915.

Wilson repeatedly offered his services to bring about a "peace without victory." These offers were declined, but in response to U.S. pressure the Germans agreed to respect American shipping and lives to the extent of giving adequate warning before sinking contraband vessels.

AMERICA ENTERS THE WAR. These moves created an atmosphere of precarious peace and economic prosperity. Together, they gave Wilson a narrow victory over Charles E. Hughes in the 1916 campaign. The Democratic slogan, "He kept us out of war," however, was soon forgotten. Germany was scoring victories on every front; as 1917 opened it seemed clear that, barring American intervention, the Central Powers could probably dictate the peace terms within six months. The course of the American election may have encouraged the German High Command in the belief that the American people could not easily be brought into war; at any rate, they decided on the gamble. To insure victory in a quick drive, it was necessary to stop American arms shipments, and so, on Jan. 17, 1917, Count von Bernstorff, the German ambassador to Washington, informed Secretary Lansing that Germany would immediately resume unrestricted submarine warfare.

In the next few weeks eight American ships were sunk. Public opinion was further inflamed when the government intercepted a note purporting to be a German promise to Mexico to restore the territory lost to the U.S. in 1848 if that nation would join the war against the Allies.

The renewal of submarine warfare was probably not calculated to keep the U.S. out of the war but rather to enable Germany to win before our aid could become effective. In this, the plan failed completely. On April 6, 1917, America entered the war against Germany.

Thereafter, events moved rapidly. The Allied armies gained in morale at the prospect of American aid, and resistance stiffened against the on-

rushing Germans. On May 18, 1917, the Selective Service Act was passed, and the first part of the million-man draft army reached France in June 1917. The main body of the American army was still in training in the U.S. Could it be brought into play against the German armies in time? In the fall of 1917, Russian opposition had collapsed after the revolutionary government overthrew the Czar. Italy was losing battles to Austrian armies. In the spring of 1918, the numerically superior German armies launched a series of offensives in the west which by June almost succeeded in driving the Allied armies into the sea. Desperate entreaties were made by the Allies for more and more American troops. The U.S. met the challenge; by October 1918 there were almost 2,000,000 American troops in Europe. In July, American divisions checked the great German offensive on the Marne and launched the counterattack. By September Allied victories had driven the Germans back and had sealed their doom. In October the Hindenburg Line was pierced.

Wilson had in the meantime been fighting for the Allied cause by enunciating the doctrines which he considered to be the basis for a just peace. By insisting that we were fighting the autocratic German government and not the German people, and that the peace treaty should not impose punitive reparations or annexations against the will of the peoples involved, he hoped to weaken German morale. In January 1918, Wilson sent his "Fourteen Points" (*q.v.*) message to Congress, as the basis of a just peace. These included: open diplomacy, freedom of the seas, reduction of armaments, removal of international economic barriers, adjustment of colonial claims, national self-determination, and a league of nations.

With military defeat and invasion of Germany imminent, the Imperial German Government appealed to Wilson to negotiate on the basis of the Fourteen Points. But revolution swept the German government out; Kaiser Wilhelm abdicated and fled to Holland. On Nov. 11, 1918, World War I ended.

HOME FRONT WAR. Before this final victory was achieved, the economic and political life of the U.S. underwent the most drastic change in its history. The submarine menace, great enough before, became the most important problem that the warring nation had to solve. Ten days after the declaration, Congress created the Emergency Fleet Corp. with powers sufficiently broad to enable it to turn out new bottoms faster than they could be sunk. In the course of the war, U.S. tonnage multiplied 1,000 per cent.

A Council of National Defense, created in 1916, coordinated industries and resources for the war effort. Operating under it were industry, trade,

finance, and labor boards. In August 1917, the Food Control Act gave the government wide powers to control food production, prices, and distribution. In March 1918, the government took over control of the railroads, after the problems of shipping the tremendous tonnage of freight and the millions of men proved to be too great without central control. About one-third of the gigantic cost of the war was met by increased taxes and two-thirds by four "Liberty loans" and one "Victory Loan," all of which were oversubscribed.

THE LEAGUE OF NATIONS. Wilson's immense prestige and the end of the war put him in a position to exert influence on the world to write a peace which might prevent the outbreak of another war. But a series of political blunders dissipated this advantage. In the Congressional elections in the fall of 1918, Wilson appealed to the voters to return a Democratic majority, instead of asking for the election of candidates who supported his views, regardless of party affiliations. The people responded by electing a Republican Congress. By heading the American peace delegation to Versailles he lost much of the moral influence which he could have exerted had he remained in the U.S. aloof from the bickering and quarrels of the peace conference. His failure to appoint any prominent Republicans to his delegation after the Republicans had triumphed at the polls did not bode well for the reception the peace treaty would receive in the Senate.

The Treaty of Versailles (*q.v.*) violated many of Wilson's Fourteen Points. He accepted that treaty, however, because it incorporated the creation of the League of Nations which he hoped would correct the treaty's mistakes.

Opposition to the Treaty of Versailles and the League of Nations was widespread in the U.S. Republicans wanted to defeat their ratification by the Senate and thereby weaken Wilson and the Democratic party in preparation for the Presidential election of 1920. Liberals felt that the treaty was too harsh; some people felt that it was too easy. Isolationism and apathy among many Americans turned them against the League of Nations as a mechanism which might draw us into foreign disputes again. Wilson might have won the Senate's approval, nevertheless, had he been willing to accept the Senate's amendments and reservations. Wilson refused and took the issue to the people in a speaking tour through the West during which he suffered a paralytic stroke. In March 1920, the Senate rejected the treaty and the League of Nations. Not until 1921 was a peace treaty concluded between the U.S. and Germany. The U.S. had turned its back on Europe.

In the Presidential elections of 1920 the Republican candidate, Senator Warren G. Harding, of Ohio, campaigning on a platform which called



WORLD WAR I

Victory Parade of the 77th Division in New York, 1919

for a return to what he called "normalcy," decisively defeated the Democrats, carrying along with him a Republican Congress.

"NORMALCY." Harding's philosophy of government was to give business a free hand and to subsidize it generously. Steamship and aviation companies received handsome subsidies for carrying mail. Taxes were greatly reduced for the rich, with no comparable reductions for the middle classes and workers. The railroads were returned to private ownership and much of the war shipping was sold to private interests at bargain prices. Antitrust activity was almost nonexistent. Tariff rates were raised.

The farmer and the worker did not share in the administration's generous handouts. For agriculture the break in farm prices in the mid-20's meant a sharp increase in farm mortgage disclosures and farm tenancy. The worker's wages never rose as sharply as did profits.

The easygoing but weak Harding was surrounded by unscrupulous politicians of the "Ohio gang" who were responsible for the noxious scandals in the Veterans Bureau and the Department of Justice, and Teapot Dome—the fraudulent leasing of government oil reserve lands involving three cabinet members.

UNITED STATES

In 1923 Harding died and was succeeded by Vice President Calvin Coolidge, of Massachusetts. Coolidge's administration was a repetition of Harding's except for the absence of the gross corruption and the political scandals.

In the election of 1924, Coolidge was chosen by the Republicans and John W. Davis, a conservative lawyer, received the Democratic nomination. Dissatisfied by these choices, the Progressives, revived by farm discontent and the thoroughly conservative stand of both Republicans and Democrats, nominated Senator La Follette as their Presidential candidate, and called for public ownership of railroads, estate and inheritance taxes, and revision of the Treaty of Versailles. La Follette polled almost 5,000,000 votes, the highest third-party vote in American history, but Coolidge won easily.

In 1928, when Coolidge did "not choose to run," the Republicans nominated Herbert Hoover, who had been an able Secretary of Commerce under Harding and Coolidge. Alfred E. Smith, the Democratic candidate, had been a popular and capable governor of New York, but he was a Catholic, a "wet," and a Tammany man. Hoover was swept into office on his promise to continue the "Coolidge prosperity" by depending on the protective tariff.

THE TWENTIES. The growth of cities, the development of the automobile, and mass production were three outstanding characteristics of this period. Henry Ford, who perfected mass production, became an international symbol of American technical efficiency. The tremendous expansion of the automobile industry and its subsidiary industries was the foundation of American economic prosperity and the basis for an equally important expansion in urban life. There was a marked shift in population from farm to city; the agricultural states lost heavily to the industrialized states. The radio, the telephone, motion pictures, and syndicated newspapers profoundly affected social and cultural life.

PROHIBITION. The Eighteenth Amendment (adopted 1919) made Prohibition (*q.v.*) a national policy, but also created one of the most serious social and political problems of the twenties. The Volstead Act (*q.v.*) was difficult to enforce. Illegal manufacturing and smuggling provided an ample supply of alcoholic beverages which were distributed by "speakeasies" and "bootleggers." Racketeering, bribery, and corruption of public officials were widespread and crime statistics mounted yearly. Prohibition finally became a political issue and in 1932 the Democrats came out unequivocally for repeal. Early in 1933, after the inauguration of President F. D. Roosevelt, an amendment for repeal of the prohibition laws was introduced, and before the end of the year this was adopted as the Twenty-first Amendment.

THE DEPRESSION OF THE THIRTIES. The Hoover administration which had begun with the country at the high tide of prosperity soon was confronted with the worst depression in American history. The dramatic stock-market crash of October 1929 wiped out billions of dollars in paper profits on the stock market, ruined millions of speculators and investors, bankrupted businessmen, closed mines, factories, stores, and banks, and created widespread unemployment. But the crash was only symptomatic of deeper faults in the economic system. Farmers had been suffering from the effects of depressed farm prices since the mid-20's, coal mining and textiles had been "sick" industries all along. The mass of the people did not earn enough to buy back what they produced. High tariffs choked foreign trade and prevented the sale of "surplus" production abroad. Easy credit encouraged excessive installment buying and speculation. Unemployment increased dangerously; industry was obliged to cut back its production, and the industrial production of the nation descended suddenly from the high point it had so recently achieved. To make matters worse, the depression became worldwide; most of Europe had experienced continual hard times since the war, and the American crash only served to intensify the existing condition. Hoover's philosophy of "rugged individualism" proved entirely inadequate to meet this desperate situation. He refused to undertake a program of direct relief to the needy. For the most part his economic expedients were designed to restore prosperity "from the top," by providing ample credit to banks and industry in the hope that this would filter downward in the normal course of business. The hope did not materialize, and the President resorted to drastic economies to balance the budget. Outstanding among Hoover's financial devices was the *Reconstruction Finance Corp.* (RFC), created in 1932 with the object of keeping railroads, large industries, and utilities in operation through the difficult period. The depression deepened, however, with the number of unemployed growing without sign of change. By 1932 there were, by even conservative estimates, over 11,000,000 unemployed. Banks and businesses were failing by the tens of thousands. Farm prices had dropped to record lows. National income was only half of the \$80,000,000,000 of 1929. Decisive and bold action without further delay was needed to prevent a complete collapse of the nation's economy.

THE NEW DEAL. With the situation unimproved, President Hoover's term drew to a close. In the election of 1932 he was opposed by Franklin Delano Roosevelt, governor of New York State, who promised a "new deal" for the nation. Roosevelt won by an overwhelming electoral vote and a popular majority of 7,000,000 votes.

Immediately upon taking office, he closed the country's banks for a "holiday" period to forestall the collapse of the financial machinery.

It was soon apparent that Roosevelt's first, dramatic action was more than a gesture; the new President embarked immediately on a vigorous program of legislation characterized by a clear acceptance of responsibility for the needy. In order to restore a functioning economy, Roosevelt attempted to revive prosperity from the bottom, *i.e.*, by creating mass purchasing power while at the same time providing subsistence for the otherwise destitute unemployed. Outstanding among the agencies created by the early "New Deal" administration were the *Civilian Conservation Corps* (CCC), which employed about 300,000 young people in land reclamation and conservation projects; the *Civil Works Administration* (CWA), a make-work agency that created about 4,000,000 jobs and was replaced in 1934 by the *Works Progress Administration* (WPA); and the *Public Works Administration* (PWA), which was designed to stimulate heavy industry. To resettle industry and insure fair competition and labor practices, the *National Industrial Recovery Act* (NIRA) was passed in June 1933, but invalidated by the Supreme Court two years later. A similar fate was accorded to the *Agricultural Adjustment Act* (AAA) of May 1933, which operated to reduce agricultural output and sustain prices. In like fashion the "New Deal" passed legislation affecting banks, security sales, gold circulation, etc. These measures did not end the depression, but a slight upswing was noted, and some of the worst consequences in terms of individual suffering were probably averted. Industries engaged in interstate commerce were brought under the provisions of the *National Labor Relations Act* (NLRA) of 1935 which ensured collective bargaining rights to organized labor. The *Social Security Act* of 1935 provided unemployment and old-age insurance for many categories of workers. The Fair Labor Standards Act of 1938 placed a ceiling on hours and a floor on wages. The creation of the *Tennessee Valley Authority* (TVA) marked the beginning of a great experiment in regional development. It offered a coordinated program to achieve flood control, improved river navigation, irrigation, and hydroelectric power. The National Resources Planning Board attempted an over-all approach to the problem of planning the nation's economy. In the field of conservation it carried forward the conservation work of Theodore Roosevelt. It also made important studies in the fields of technology, transportation, population, and urban growth.

The President was severely criticized for the lavish expenditure of government funds necessitated by his many-sided social program. How-

ever, he was re-elected in 1936 by an even larger majority than before, and in 1940 shattered the precedent set by Washington and Jefferson by standing for—and winning—re-election for a third term against Wendell Willkie.

One of the collateral effects of the "New Deal" was the increasing self-consciousness of labor. Much of the legislation included clauses protecting labor's interests and its right to bargain collectively. The major instrument of such bargaining up to this time had been the *American Federation of Labor* (AFL), composed of craft unions whose membership was composed mostly of skilled workers. The AFL, however, made little provision for the millions of unskilled and semi-skilled workers of the mass production industries. In 1935 a new organization of such workers began to emerge on a national scale. The *Committee* (later *Congress*) of *Industrial Organizations* (CIO) was built on the principle of industrial unionism without reference to individual skills. Spearheading this movement was the United Mine Workers of America (*q.v.*).

Opposition to the "New Deal" came primarily from conservative elements who feared the growing power of labor and the huge public cost of the relief program. In this they had the support of the Supreme Court, which declared much of Roosevelt's basic legislation unconstitutional. The justices, however, were not unanimous in their condemnation of the New Deal, some of the more important decisions being carried by a vote of 5-4. In 1937 Roosevelt proposed to add members to the bench in order to change the political weight in favor of his administration. The project was roundly denounced by the opposition and defeated in Congress, but resignations and other vacancies shortly made it possible for the President to appoint new members to the Supreme Court who were more sympathetic to the government's program and believed that the Constitution was a flexible instrument.

Added to the difficulties of depression, Roosevelt faced a tense world situation. Preliminary skirmishes of the Second World War broke out in Ethiopia and Spain in 1935 and 1936 and spread to the rest of the world in 1939. The latter stage solved at least one problem of the "New Deal." War industries restored the national economy and brought a final end to the 10-year-old depression.

FOREIGN AFFAIRS BETWEEN TWO WARS. Much of the opposition to organized methods of enforcing peace arose from the conviction that war could be outlawed by moral agreement. Toward this end the U.S. joined in several conferences designed to reduce naval armaments and balance existing fleets in such a way as to make war impractical. The Washington Naval Conference of 1921-22 agreed upon the suspension of capital ship construction for a period of 10

years, and the maintenance of capital ship strength at a ratio of five each for Great Britain and the U.S. to three for Japan, to 1.67 each for France and Italy. At the same time, two treaties were drafted with respect to the Far-Eastern question (*q.v.*). In the *Four Power Treaty*, Great Britain, the U.S., France and Japan each agreed to respect each other's possessions in the Orient, and to settle disputes by peaceful means. The *Nine Power Treaty* was a general undertaking by all the Washington conferees to respect China's territorial integrity.

Disarmament seemed to have been auspiciously begun at Washington, and a second conference was called at Geneva in 1927. While these discussions were unproductive, they laid the groundwork for the 1930 London Conference which extended the "holiday" on capital ship construction for an additional five years.

In 1928, Secretary of State Kellogg concluded a pact with French Foreign Minister Briand in which it was agreed to outlaw war as a means of settling disputes. The Kellogg-Briand Peace Pact was endorsed by more than 60 nations, but within a few years many of them had devised formulas for violating its provisions.

Meanwhile, another vexing international problem continued to evade solution. The U.S. had made loans to her allies of about \$10,000,000,000 which, with interest, amounted to about \$22,000,000,000 over a 62-year repayment period. To repay these debts, the Allies levied upon the defeated nations an unspecified amount of war damages known as reparations (*q.v.*). Thus, while the U.S. did not exact reparations, the repayment of loans became attached to Germany's ability—and ultimately her inability—to pay the bill. In 1924 the Dawes Plan, formulated by Charles G. Dawes as a semiofficial representative of American finance if not of the American government, attempted to stabilize German economy and thus make possible the collection of our loans. The Dawes Plan failed to achieve this goal, and in 1929 was replaced by the Young Plan with no better results. Meanwhile many economists became alarmed over the possible consequences of German bankruptcy under the staggering debt load. To diminish the possibility of economic collapse, President Hoover proposed an international moratorium on war debts and reparations for a period of one year from June 1931. At the end of that time the situation showed no improvement and the principal nations involved in the controversy, with the exception of the U.S., met at Lausanne, Switzerland, to consider revision of the entire problem. The conferees agreed to cancel reparations on the condition that the U.S. would reconsider the question of war debts. This country refused to recognize the connection between the two obligations and insisted upon



Courtesy Federal Public Housing Authority

SLUM CLEARANCE IN THE 1930's

Slum dwellings in a Southern city (left) were razed and replaced with a Federal Public Housing Project (right)

continued payments. However, international affairs were approaching a new critical pass in which force was beginning to replace conciliation and good will. In 1933 several nations defaulted in their installments, and by 1934 only Finland continued to accept its full share of the financial burden.

The careful structure of disarmament and non-aggression pacts was broken by the Japanese in 1931 with the occupation of the Chinese province of Manchuria. The U.S. immediately protested against this violation of the Kellogg-Briand Pact and our stand was followed by the League of Nations. Japan, however, was not deterred, and the machinery of moral suasion suffered its first major setback. The problem of Philippine independence, which had long been a prominent part of America's colonial policy, was thrown into new relief by Japan's aggressive imperialism. That nation's avowed scheme of Far-Eastern hegemony would undoubtedly be extended to the Philippines as soon as these islands obtained independence. But freedom had been promised, and was urgently desired by certain agricultural producers who were anxious to impose a tariff on competitive products. In response to this demand, the Hare-Hawes-Cutting Act of 1933 was passed over President Hoover's veto granting Philippine independence 10 years after the acceptance of the act by the Philippine legislature. The law, however, was rejected by the Filipinos because of the economic consequences of the projected separation. While the situation remained unsettled, F.D. Roosevelt was elected to the Presidency, and in 1934 Congress passed the Tydings-McDuffie Act softening the objectionable phases. This act was ratified by the Philippine legislature and on July 4, 1946, the Philippine Islands became a sovereign and independent republic.

F. D. ROOSEVELT'S FOREIGN POLICY. President Roosevelt's foreign policy was marked by a reversal of several standing attitudes with regard to Europe, and especially by a new doctrine of inter-American relations. In the former field was his early recognition of Soviet Russia which had been persistently refused by previous administra-

tions. With regard to the Western Hemisphere, he quickly put into effect the policy of the "Good Neighbor." In 1933 a revolution broke out in Cuba; despite the existence of the Platt Amendment which gave this country the right to interfere in Cuban affairs, Roosevelt followed a neutral course. When the revolution had been concluded without American intervention, the President recognized the new regime in concert with other Latin-American nations, and on May 31, 1934, the Senate ratified a new treaty abrogating the Platt Amendment. In the same year the President secured from Congress legislation empowering him to negotiate reciprocal trade agreements with other American countries under which hemisphere trade could be encouraged by the reduction of tariff barriers.

Roosevelt came to power at about the same time that Adolf Hitler assumed control of the destiny of the German nation and opened a new phase in world diplomacy. In 1933 Germany withdrew from the League of Nations, proceeded to rearm in violation of the Versailles Treaty, and ended all effective attempts at achieving peace through mutual agreement. In December 1934 Japan denounced the Washington and London Naval Treaties, and a few months later Germany made official her repudiation of the Treaty of Versailles. Already reconciled to this move, the rest of the world, including the League nations and the U.S., did nothing to alter the course of events. Convinced that the League could not function effectively, Italy proceeded to violate the covenant by attacking Ethiopia. The year 1935 ended with a universal conviction that another war was in the making; peaceful efforts having failed, the nations of Europe began to ready themselves for the impending conflict by undertaking large-scale rearmament programs. The following year Germany and Italy put their new military techniques to a test by backing a Fascist revolution in Spain; in 1937 Japan climaxed six years of gradual incursions on Chinese territory by launching a full-scale war. The attitude of the U.S. toward this conflict was tested on Dec. 12, 1937, when Japanese bombs sank the U.S. gunboat *Panay* in the Yangtze River. President Roosevelt

issued an immediate protest in which he demanded full indemnity and made clear his complete lack of sympathy for the aggressive methods of the Japanese. Japan accepted responsibility for the incident, but proceeded uninterrupted with her Chinese adventure.

Meanwhile the war clouds over Europe were growing darker. The short-lived settlement at Munich (*q.v.*) in 1938 failed to halt the drift toward open war. Recognizing the inevitable, many Americans began to take sides. From the first it was clear that public opinion would not tolerate full support of the Berlin-Rome-Tokyo Axis. The question, then, was whether to aid the anti-Axis forces (chiefly England and France), or to remain entirely neutral in the conflict.

Attempting to insulate the U.S. against the contagion of foreign wars, Roosevelt pursued the twofold policy of cementing inter-American relations while restraining traffic in dangerous areas where existing conditions might produce "incidents" capable of provoking war. The first policy was manifested by full participation in the Pan American Conferences of the 1930's (see *Pan American Congress*) and by conciliatory handling of the dispute with Mexico over that country's expropriation of foreign, including American, properties, chiefly oil and silver. See *Mexico*.

The second phase of the neutrality program arose from more complex origins. In the decade or more of disillusionment that followed World War I, the conviction gained great currency that the war had been produced by the chicanery of munitions makers. The theory attained considerable strength in the light of the revelations of historians and political analysts who succeeded in proving that fantastic profits had accrued to the "Merchants of Death"—one of the many opprobrious titles applied to the war profiteers.

While no proof was adduced that these elements had caused the war, the public grasped the revelations and invested them with a dramatic significance that no President could afford to ignore. The point of the arguments against embroilment in wars was that mere juridical neutrality was insufficient; a method had to be found to prevent the accretion of profits from foreign conflagration. Trade with belligerents must be prevented, and such as could not be prevented must proceed with the clear understanding that the government would not provide protection. To implement this total insulation from foreign wars, the Roosevelt administration adopted a series of neutrality laws that effectively "took the profit out of war." Loans to warring powers or factions were prohibited, and it was forbidden to ship arms or munitions to belligerents. Much of the legislation was passed despite the objection of the President, who protested that the aggressor nations who made war had

no need for our munitions and profited by our refusal to aid their victims. Such was the temper of the people, however, and so strong their conviction that economic involvement was a direct cause of war, that these protests were unheeded. Whatever its motives, the neutrality program failed to secure the peace. In terms of immediate results, it reacted to the benefit of the Italian invaders of Ethiopia, and the Italian and German sponsors of the Fascist revolution in Spain. The Axis nations, meanwhile, were bound by no illusions; they proceeded to attack the regions they coveted, taking full advantage of our nonintervention and the prevailing European policy of appeasement. The diplomatic climax came on Aug. 23, 1939, when Germany and Russia concluded a nonaggression pact; the military climax followed a week later when Germany invaded Poland (Sept. 1, 1939). England and France refused to retreat before this renewal of aggression, and World War II was on.

"ARSENAL OF DEMOCRACY." As the drift to war become unmistakable, Congress relented one of its isolationist tenets and yielded to the President's demand for more adequate defenses against the possibility of attack. After a quiet winter, however, the European blitzkrieg broke over the Low Countries and France (1940). When these countries were defeated within a few weeks, isolationist sentiment was weakened; the U.S. still hoped for peace, but realized that some measures must be taken in the event that the hopes proved vain. In July Congress added \$5,000,000,000 to its previous army appropriations of \$3,800,000,000; in September it enacted the first peacetime compulsory military service law in U.S. history. Under continual pressure from the President, additional legislation was enacted, and, more significantly, no barriers were raised against the numerous executive proclamations by means of which Roosevelt threw the weight of his government behind the anti-Axis forces. The Lend-Lease Act of March 1941 made the resources of the U.S. available to these nations, and the re-exportation of American goods to the Axis via South American ports was made virtually impossible by the proclamation of a "blacklist" of suspect neutrals with whom trade was forbidden. All aliens in the U.S. were required to register with the government as a check on potential saboteurs, and in June 1941 German and Italian consulates were ordered closed.

Gigantic as these defensive measures still seemed to many people, events were soon to prove their pitiful inadequacy. On Dec. 7, 1941, Japan attacked the U.S. naval base at Pearl Harbor, inflicting tremendous damage on the fleet in the harbor. The next day Congress declared war on Japan, and three days later accepted a declaration of war by Germany and Italy. Overnight the entire nation closed ranks angrily, prepared to

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resist and punish unprovoked aggression. Anger alone, however, was not equal to the tasks ahead. In the Pacific the U.S. and her Allies lost ground steadily before the Japanese tide. The Philippines held out for a short time, but within a few months they had become only a symbol of heroism of Corregidor and Bataan. The Malay Peninsula and the Netherlands East Indies fell after costly naval defeats, and Japan pressed on the outskirts of Australia. In the European theater, the U.S. fared no better. Not yet strong enough to make her aid effective, she found Germany's efficient submarines taking terrific toll in ships and lives. But some vessels did get through, bringing vital matériel to Russia (invaded by Germany in June 1941) and to England where, slowly, its weight was brought to bear against Germany. The gates of Moscow remained closed to the invaders after the great Russian victory at Stalingrad in November 1942. In the fall of 1942 the British armies in Africa bolstered their last-ditch defense of Suez with a smashing offensive against Gen. Rommel's desert forces at El Alamein. The offensive proved successful, and while the Nazi troops were still in retreat, a huge Anglo-American invasion burst upon North Africa (November 1942). Driving from the east and the west, the combined armies of the Allies quickly cleared the last invader from the southern shores of the Mediterranean.

The Russian defense of Stalingrad and the invasion of North Africa proved to be the turning points of the war. The initial victories over German arms were followed by the invasion of Europe by Anglo-American armies under the command of Gen. Dwight D. Eisenhower (*q.v.*) on June 6, 1944, at the Normandy beachheads (see *France*). While the Allies broke through the German defenses in France, Luxembourg, and The Netherlands, the Red Army drove into Germany from the East. After carrying the war into Germany, the Allied advance was temporarily hampered by a counterattack from the Ardennes (Oct. 16, 1944), but by February 1945, Eisenhower's armies went toward the ultimate defeat of the Nazi Reich with giant strides. Russian and American forces met at Torgau, near Leipzig, Germany, Apr. 26, and on May 7, 1945, the Germans surrendered. V-E Day had come at last.

In 1943, 1944, and 1945, American naval, air, and army forces in the Pacific began rolling back the Japanese from their island strongholds. This process of "island hopping" involved major naval battles and heavy fighting on Guadalcanal, Iwo Jima, and Okinawa. By the summer of 1945 the Japanese power in the Pacific had been broken. American forces held all the strategic islands, including the Philippines, and under the command of Gen. Douglas MacArthur were preparing for the invasion of the Japanese home islands. In



Official U. S. Navy Photo

WORLD WAR II

Pearl Harbor, December 7, 1941

August 1945, the Japanese city of Hiroshima was destroyed with America's secret weapon—the atom bomb. A few days later, Nagasaki suffered the same fate. Russia, which had all through the war been at peace with Japan, at least officially, declared war on her Far-Eastern rival. Japanese opposition collapsed and on Aug. 14, 1945 (V-J Day) the Japanese surrendered aboard the American battleship *Missouri* in Tokyo Bay. World War II was over.

WORLD WAR II: HOME FRONT. Despite the fact that more than 12,000,000 men were in the armed forces, the U.S. economy proved capable of producing more than ever before. The "arsenal of the democracies" sent a huge supply of guns, tanks, planes, ships, food, and clothing overseas to equip both its own armed forces and those of its Allies under the Lend-Lease program. Moreover, the supply of consumption goods for civilians was actually increased, so that Americans were eating more meat, smoking more cigarettes, and generally living better than they had in the prewar period. Nonetheless, there were some shortages that led Congress to give President Roosevelt unprecedented economic powers. Rationing and price controls were administered by the Office of Price Administration, while the War Production Board, the War Manpower Commission, and other agencies set priorities, regulated labor and materials, and coordinated production to ensure peak output. Soon after Pearl Harbor American labor made a no-strike pledge for the "duration," and almost all disputes were handled without work stoppages through the National War Labor Board. The huge costs of the conflict were financed by heavy taxes on individual and corporate incomes, by higher entertainment taxes, duties on luxury goods, and war bond sales.

President Roosevelt was re-elected for a fourth term over his Republican opponent, Thomas E. Dewey, in November 1944. He attended the Yalta Conference with Prime Minister Winston S. Churchill and Premier Joseph Stalin in February 1945, reaching agreement on a number of important issues regarding the establishment of the U.N. and peace settlements in both Europe and the Far East. Then, shortly before he was to open the U.N. Charter Conference at San Francisco, he died. His death on April 12, 1945, caused by a cerebral hemorrhage while he was at Warm Springs, Ga., was an utter shock to the nation and the world. Vice President Harry S. Truman immediately took the oath of office, entering the White House almost at the moment when the war was ending, and the postwar responsibilities of the U.S. fell upon his shoulders.

THE POSTWAR PERIOD: 1945-1950. At the close of World War II most Americans regarded their future problems as primarily domestic. Looking back on the aftermath of World War I, they experienced a similar desire to return to "normalcy" and anticipated some of the economic difficulties that plagued the 20's and 30's. The new U.N., with its headquarters in the U.S., was expected to solve, through a continuance of Great Power cooperation, most of the world's international problems. In the new air age the U.S., it was realized, could not again withdraw into hemispheric isola-

tion; but its main service to the rest of the world would be to retain a healthy economy and thus avoid the danger that another great depression might foster the growth of new totalitarianism and aggression.

In reality, however, the first five years of the postwar period demonstrated that the prevailing pessimism toward domestic problems was as false as were the over-optimistic assumptions of international harmony. The Soviet Union's constant pressure to expand its influence amid the economic dislocations, the national unrest, and the power vacuums left by the war caused the U.S. to take countermeasures through, at first, economic and later military assistance to countries which were still able to maintain their independence. This constant call on American resources for overseas aid prevented any possibility of a serious slackening in industrial activity. Moreover, before 1950 the U.S. capacity for building strength at home and abroad was only lightly taxed in comparison with what was expected in the years ahead. The outbreak of the war in Korea on June 25, 1950, signaled the end of a period that could be considered relatively untroubled. With overt Communist aggression prevailing, there was national recognition of the need to reconstruct armed might as the shield of the Republic.

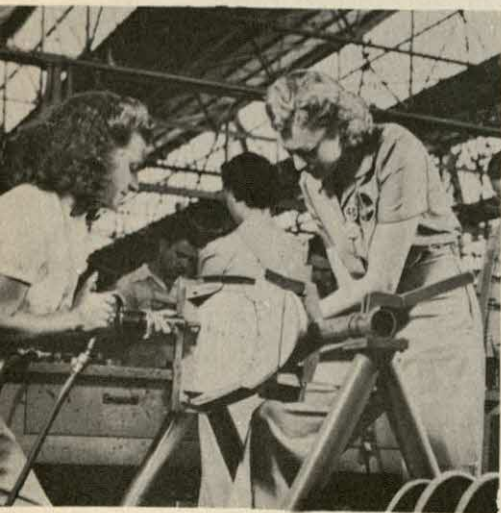
Such prospects were far from the American mind in 1945 and 1946, when the order of the day was to "get the boys home" as swiftly as possible. The Army, which at its peak had numbered 8,300,000 men, discharged 7,000,000 in less than 12 months. The Navy put hundreds of ships in "mothballs," and war surplus materials were sold at an outright loss. General Dwight D. Eisenhower, then Army Chief of Staff, told Congress that an army of 800,000 men might be necessary for the next 15 or 20 years; and this was not regarded as a low estimate, at a time when demobilization and reconversion of industry were the nation's main interest. Everyone wanted new automobiles, houses, refrigerators, and a novel item for the family budget—a television set. By January 1946 it was estimated that 52,000,000 workers were engaged in civilian jobs, with only 2,000,000 unemployed. By July employment had passed the 60,000,000 mark.

One important domestic concern was a succession of labor disputes. The United Automobile Workers (CIO) called out 180,000 strikers from the plants of General Motors in November 1945. The walkout lasted 113 days. Steelworkers, 750,000 strong, went out in January 1946. Packing house workers, electrical workers, and, finally, John L. Lewis' coal miners also struck in 1946. Most of the disputes were settled by wage increases of 17½ and 18½ cents an hour, but the stoppages were even more costly in lost produc-

WOMEN IN INDUSTRY

The tremendous expansion of heavy industry during World War II opened new vistas of employment for women. Entering fields of work previously thought too strenuous, women proved competent and efficient. In January 1951 about 18,650,000 U.S. women were employed; this figure showed a sharp rise from 12,090,000 in December 1941, and 8,430,000 in 1920.

Courtesy U. S. Dept. of Labor



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tion. The coal strike was estimated to have cost \$2,000,000,000 in potential output. This was the celebrated "first round" of postwar strikes that ultimately led to Congressional passage of the Taft-Hartley Labor-Management Relations Act in June 1947. The Act, which became law over President Truman's veto, drastically revised the Wagner Act of 1935. Labor generally regarded the new Act as inimical to labor interests and sought its repeal. However, during the period of high employment that followed passage of the Act, unions continued to make substantial gains, negotiating wage increases, pensions, and other benefits, both with and without the use of the strike weapon. See also *National Labor Relations Act*.

Business activity failed to develop the deflationary spiral so widely feared at the end of the war. The nation's industrial production index (1937 = 100) ranged from 150 in 1946 to 170 in 1948. Agricultural production (1937 = 100) was 128 in 1946 and 139 in 1949. The national income was \$180,300,000,000 in 1946, \$223,500,000,000 in 1948, and \$216,800,000,000 in 1949. The only slight recession came in 1949 when the unemployment figure for the year reached 3,400,000, or 5.5 per cent of the labor force. Wartime price controls lapsed in July 1946, and the cost of wheat, beef, and other foodstuffs immediately jumped to 15- and 20-year highs. Despite the initial violent fluctuation, however, the trend for the five-year period was milder; the cost of living index (1937 = 100) was 136 in 1946 and 165 in 1949, while the wage index for hourly earnings (1937 = 100) was 174 and 225, respectively. The general picture was one of an expanding economy, with the postwar housing shortage slowly being alleviated and with swifter progress in production of consumer goods.

The cost of living was one of the main issues of the domestic political scene, but Congress and the Administration failed to come to terms on measures to control it effectively. The 1946 elections gave the Republican party majorities in both houses of Congress, and few important pieces of legislation concerning internal affairs were passed. A G.O.P. victory, with Thomas E. Dewey as the standard-bearer, was widely predicted in the 1948 Presidential contest. President Truman's chances of re-election were jeopardized by a rebellion of Southern Democrats, opposed to his proposed civil rights program, who ran a "Dixiecrat" candidate (J. Strom Thurmond, governor of South Carolina). Moreover, Henry A. Wallace, who left the Truman cabinet in 1946 because he objected to the Administration's firm policy toward Russia, headed a Progressive party ticket which threatened to cut into Truman voting strength in New York City and other key urban centers. But Mr. Truman, after campaigning vigorously against the record of what he called the "do-nothing" 80th Congress,



SIGNING THE NORTH ATLANTIC PACT

Dean Acheson, Secretary of State, lifts his pen to sign the North Atlantic Treaty for the U.S. Watching are President Truman and Vice President Barkley

carried 28 states and received 303 electoral votes as against 16 states and 189 electoral votes for Gov. Dewey.

FOREIGN RELATIONS: 1945-1950. The growing rift between the U.S. and the Soviet Union became the predominant concern of American foreign policy as the wartime agreement between the Great Powers faded. Mounting tension resulted from the failure of the Russians to allow democratic governments to develop freely in the Eastern European states, the breakdown of cooperation in administering the joint occupation of Germany, the Communist-led uprisings in Greece, and the repeated Soviet vetoes in the U.N. Security Council. Peace treaties for Italy, Hungary, Bulgaria, and Rumania were not signed until Feb. 10, 1947 (in Paris), and sessions for drafting settlements on Germany and Austria ended in deadlock.

In response to Soviet challenges, U.S. policy was forced to take on new vigor. Great Britain, in economic difficulties despite the \$3,750,000,000 loan from the U.S. in 1946, informed Washington in February 1947 that she could no longer continue assistance to the Greek government in its struggle with Communist guerrillas. This led to the development of the Truman Doctrine, a milestone in postwar U.S. policy. The President asked Congress for a \$400,000,000 grant to assist both Greece and Turkey economically and militarily, stating that it must be U.S. policy "to support free people who are resisting attempted subjugation

by armed minorities or by outside pressures."

Initial attempts to deal with postwar economic dislocation through the U.N. Relief and Rehabilitation Administration, to which the U.S. was a heavy financial contributor, were coming to an end, but it was apparent that Europe's plight was still serious. General George C. Marshall, then Secretary of State, made a speech at Harvard on June 5, 1947, in which he expressed the willingness of the U.S. "to assist in the return of normal economic health in the world, without which there can be no political stability and no assured peace." European leaders immediately conferred in Paris to take advantage of this offer, but the Soviet Union refused to cooperate and prevented the Eastern European regimes from taking part. See also *European Recovery Program*.

Continued tension between East and West, heightened notably by the Communist coup in Czechoslovakia in February 1948 and the Russian blockade of Berlin in 1948-49, led to the formulation of a mutual security system among members of the Atlantic community. The North Atlantic Pact was signed by twelve nations, including the U.S. and Canada, on April 4, 1949. Thereafter the treaty partners set up machinery for building balanced collective forces, and Congress passed the Mutual Defense Assistance Act of 1949 under which U.S. military aid began to flow abroad.

Another facet of U.S. overseas assistance was help for the non-industrialized areas of the world. On Jan. 20, 1949, President Truman, as the fourth point in his inaugural address, called for a "bold new program for making the benefits of our scientific advances and industrial progress available for the improvement and growth of underdeveloped areas." It was not until 1950, however, that Congress appropriated \$26,900,000 as an initial sum for the so-called Point Four program.

Early American hopes for the international control of atomic energy were thwarted by Russian intransigence. American proposals, providing for an international authority to control the production and use of uranium, thorium, and their products, were introduced in the U.N. in 1946, but the Soviet Union balked at such arrangements. The deadlock persisted, and in September 1949 President Truman announced that an atomic explosion had recently taken place in the Soviet Union, signaling the end of the U.S. monopoly of ability to produce atomic weapons. In January 1950 Mr. Truman ordered the U.S. Atomic Energy commission to "continue its work on all forms of atomic energy weapons, including the so-called hydrogen or superbomb," which would use hydrogen instead of uranium as its explosive ingredient. See also *Atomic Energy*.

Another essential East-West disagreement revolved around the future of Germany. Four-power control of the defeated nation began dis-

integrating in 1946. See also *Berlin Blockade*.

The most vexing problems for American foreign policy in the postwar period concerned the Far East. Wartime expectations that a strong and friendly China would emerge once Japan was defeated were frustrated by the successful civil war conducted by Chinese Communists against the Nationalist government of Chiang Kai-shek. Washington efforts, including a mission to China undertaken by Gen. George C. Marshall in 1946, failed to bring about a Nationalist-Communist peace, and by the end of 1949 Communist forces were dominant on the Chinese mainland and had brought about the retreat of the Nationalist government to the island of Formosa.

WAR IN KOREA. Far-Eastern events in the wake of the Chinese Communist victory provided a turning point in U.S. postwar history. World War II had brought U.S. occupation troops into the southern half of Korea, Russians into the northern half. Korea remained divided at the 38th parallel after both armies left the country. On June 25, 1950, north Korean Communist troops crossed the border in a full-scale attack designed to unify the country by force of arms. The U.N. Security Council, in the absence of the Russian delegate, called for an immediate cease-fire and asked Members to assist the Republic of Korea. President Truman ordered U.S. help at once, and the battle between U.N. and Communist forces was joined. General Douglas MacArthur was named as Supreme Commander of U.N. forces, primarily U.S. land, air, and naval forces. After early setbacks the U.N. armies swept the north Koreans back to the Yalu River. However, in November a massive intervention by the Chinese Communists reversed the military tide. When U.N. forces later regained strong positions in the vicinity of the parallel, the Communists, on the initiative of the Russian U.N. delegate, Jacob A. Malik, agreed, in June, to discuss terms for a cease-fire. See *Korea*; *United Nations*.

In the meantime, the U.S. took the initiative in writing a peace treaty for Japan. John Foster Dulles journeyed from one capital to another in 1951, eventually drafting a "treaty of reconciliation." At the same time Washington negotiated two separate mutual defense pacts, one with the Philippine Republic, the other with Australia and New Zealand. The treaty with Japan was signed in San Francisco by 48 nations on Sept. 8. Russian delegates attended the conference but did not sign the treaty.

The advent of the Korean war brought about many changes in American life. The draft (*q.v.*), which had lapsed in 1947, was reintroduced, a mammoth military budget was passed, and the armed forces began a quick build-up to bring up to 3,500,000 men into the armed services. An Office of Defense Mobilization was organized and

new taxes and wartime controls were introduced.

Meanwhile, the nation was severely shaken by the defeats suffered by the U.N. forces at the hands of the Chinese Communists in Korea in late 1950. The basis of U.S. foreign policy became the subject of a "great debate" in Congress and elsewhere. In the early part of 1951 the Senate passed a resolution which endorsed dispatching four divisions to Europe, but also stated that no additional ground troops should be sent without further Congressional approval. A still more explosive controversy arose over the conduct of the Korean war. Despite a meeting of President Truman and Gen. MacArthur at Wake Island in October 1950, friction developed between the general, who favored meeting force with "maximum counterforce," and the Administration, which had laid down a number of directives intended to limit the conflict to Korea. General MacArthur's dismissal by President Truman, on April 11, 1950, precipitated a lengthy Senate hearing on the formulation of U.S. Far-Eastern policy.

The Korean war hardened the nation's attitude toward Communism at home as well as abroad. Throughout the postwar period a number of Congressional investigations and court cases had centered on the influence of domestic Communism. In 1949 the top 11 leaders of the American Communist party were convicted of criminal conspiracy, a verdict upheld by the Supreme Court in 1951. In 1950 former State Dept. official Alger Hiss (*q.v.*) was convicted of perjury, and in 1951 several former government atomic research workers were convicted of wartime espionage for their part in relaying secrets of the atomic bomb to the Soviet Union. Senator Joseph R. McCarthy (R, Wis.) aired charges that the State Dept. was riddled with Communists and fellow travelers, a claim which was never fully proved, however. These and other instances led to Congressional passage of the Internal Security Act of 1950, a stringent measure which called for the

registration of both Communist "front" and "action" groups, banned the employment of Communists in defense plants, and provided for their detention in times of war emergencies. President Truman vetoed this measure as well as the Immigration and Nationality Act of 1952 on the grounds that the former would prove unworkable and the latter would "intensify and reinforce" the restrictions of the existing laws. Congress, however, overrode the President in both cases. See also *Civil Service; Communism*.

The U.S. during this period was also concerned over the incidence of crime, its links with politics, and charges of bribery, favoritism, and influence in government-business relationships. A Senate committee headed by Estes Kefauver (D, Tenn.) toured the country in 1950 and 1951, disclosing links between organized gambling and local political machines. Other Congressional investigations examined the operations of the Reconstruction Finance Corp., the Internal Revenue Bureau (which was subsequently reorganized), and the Justice Dept. Another significant political development was the passage of the 22nd Amendment to the Constitution, which limits a President to two elected terms.

EISENHOWER ADMINISTRATION. Twenty years of Democratic tenure in the White House were brought to an end with the November 1952 Presidential election of Gen. Dwight D. Eisenhower. The general, who had won the Republican nomination over the opposition of the party's old guard, was victor over the Democratic candidate Adlai Stevenson (*q.v.*) by 442 to 89 electoral votes and a margin of 6,500,000 popular votes. After a campaign which had blamed the Democrats for the indecision in the Korean war, high taxes, the "mess in Washington" and disloyalty by government employees, the new Eisenhower "team," composed largely of big-business executives, immediately set out to stress changes in national leadership. Congress, controlled by the



INAUGURATION DAY 1953

Dwight D. Eisenhower was first inaugurated as President of the U.S. on Jan. 20, 1953. Frederick M. Vinson, then Chief Justice of the U.S., here administers the oath of office. Outgoing President Harry S. Truman is at the far left, and Vice President-elect Richard M. Nixon at the far right

Republicans, who held a fragile majority in both houses, and the cabinet swung over to a more conservative emphasis in domestic affairs. One of the Administration's first pieces of legislation was the transferral of tidelands oil rights to the various states. Income-tax reductions went into effect on Jan. 1, 1954, and a major revision of the tax code was passed later in the year. Also in 1954 a new farm bill (providing for flexible price supports) and an act broadening social security coverage were enacted. Among the domestic problems the Administration faced were declining farm prices and a dip in industrial production, with a consequent rise in unemployment, at the beginning of 1954. Although the recession failed to gather momentum and, in fact, gave way to the greatest prosperity the country had ever experienced, net farm income dropped from the 1947 peak of \$17,191,000,000 to \$10,600,000,000 in 1955 (about 10% below 1954).

Despite a new Republican loyalty program, Sen. Joseph R. McCarthy (*q.v.*) continued to investigate executive agencies, coming into increasing conflict with members of his own party and the government. The airing of his differences with the Army, at a special televised Congressional hearing of about three months' duration, dominated the 1954 political scene. The Republican party lost its margin in Congress to the Democrats in the midterm elections.

President Eisenhower's first term ended domestically on a rather strongly conservative note, with a balanced budget as a long-sought goal and with emphasis on private investment in the development of water and nuclear power. In line with the Administration's attempt to

reduce expenditures and an outwardly reduced East-West tension, military outlays and manpower were gradually cut back. The Administration's defense policy relied almost exclusively on the retaliatory power of nuclear weapons and the striking power of the Air Force. Dramatically overshadowing President Eisenhower's first term, a heart attack in the fall of 1955 and later incapacities led to his prolonged absence from Washington.

The fighting in Korea had come to a halt on July 27, 1953, but Far Eastern conflict remained. Upon the urging of then Secretary of State John Foster Dulles (*q.v.*), the U.S. joined seven other Pacific countries in signing the Manila Treaty (*q.v.*). The government also backed the Baghdad Pact (1955), a treaty of mutual cooperation concluded between Iraq and Turkey and adhered to by Great Britain, Pakistan, and Iran, but the alliance lost a great deal of its meaning when a revolutionary government took over power in Iraq in 1958 and disassociated itself from the compact. Asia and the Middle East continued to plague the Administration, even after a Geneva "summit" conference, in July 1955, between the heads of government of the U.S., France, Great Britain, and Soviet Russia (including Communist party leader Nikita S. Khrushchev, *q.v.*). The U.S. maintained stable and friendly relations with its allies—after Dulles' early statements of "massive retaliation" against aggressors, which had caused apprehension among U.S. allies, were abandoned. The U.S. also agreed with the Soviet Union and other nations on an Austrian State Treaty (May 1955). In answer to the Chinese Communists' menacing stand toward Formosa (*q.v.*), the Congress granted the President emergency powers to defend Formosa and the Pescadores Islands against aggression; and in February 1955 the Senate ratified a mutual-security treaty with the Chinese Nationalists.

In the Near East, American diplomacy did not succeed in stabilizing the precarious situation between the Arab countries and Israel (*q.v.*) and between the Arab League (*q.v.*) member countries themselves. In order to emphasize America's interest in the Near East, Congress passed (March 1957), upon the President's urgent appeal, the so-called Eisenhower Doctrine. It firmly stated that the U.S. would help—upon request—the nations of the Near East in their determination to withstand subversion and aggression. But some countries in the area, such as Egypt, were apprehensive about aligning themselves closely with the aim of the doctrine. In the following summer, the doctrine was invoked by Lebanon, however, when she felt threatened by internal subversion and invasion; U.S. Marines were sent there and remained there for a few months. Prior to the adoption of the doctrine, the U.S. had, with

MARINES IN KOREA

Awaiting helicopter airlift to the battle area

Wide World Photo



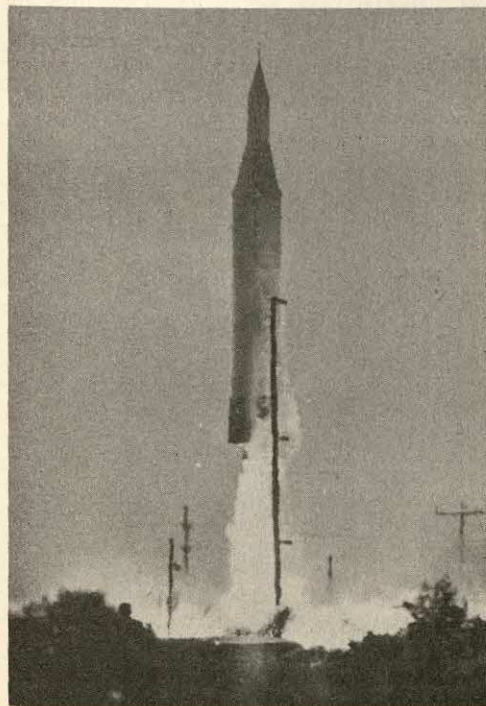
the U.S.S.R., moved decisively in the U.N. to end the Israeli, British, and French expedition against Egypt in the fall of 1956 (see also *United Nations*).

Soviet Russia, in the meantime, had surged ahead in technological and economic power. This was made evident when the first man-made earth satellite (*q.v.*) was launched by the U.S.S.R. about a year after the re-election (1956) of President Eisenhower to a second term. He and Vice President Richard M. Nixon (*q.v.*) had won a 41-state majority over the Democratic slate, again headed by Adlai E. Stevenson. Public reaction to the Sputniks, as the Russian satellites were called, and criticism from the Democrats, who had won increased majorities in both houses of Congress, led to a national reappraisal of the military and scientific position of the U.S. With the launching of its first satellite on Jan. 31, 1958, the country regained some recognition as a leading technological power. The Eisenhower government took several steps to increase military efficiency and to meet "space-age" developments. And Congress, to bolster U.S. defenses, approved a major military reorganization plan which subordinated the uniformed services to civilian authority and

SPACE EXPLORATION

Powered by a Juno II rocket, the 91.5-lb. Explorer VII satellite was launched successfully from Cape Canaveral, Fla., on Oct. 13, 1959

World Wide Photo



granted pay raises to the armed forces; permitted the transfer of atomic-weapon data to U.S. allies under certain conditions; and established the National Aeronautics and Space Administration (*q.v.*), a new civilian agency to direct and coordinate the scientific investigation of outer space.

The years 1957 and 1958 were marked by a variety of domestic developments. Record budgets of over \$70,000,000,000 each were passed in 1957 and 1958, about half of the amounts going into defense, including foreign aid. At the same time, the U.S. suffered from an economic recession, increasing unemployment, at one point, to over 5,000,000. The budget and the recession brought on some friction between the White House and Congress. In 1957 the President prodded an economy-minded Congress to accept his fiscal requests, but in 1958 he considered Congressional appropriations beyond the nation's needs and dangerously high. The Administration strongly opposed many of the spending measures Congress enacted, or at least considered, to fight the recession; and, with the decisive upturn of the nation's economy beginning at the end of 1958, the conservative approach was proved correct.

With the approach of the 1958 midterm elections, the U.S. underwent a definite change of political climate, and even President Eisenhower's long-established popularity gave way. Charging ineffectiveness in government, the danger of possible war in the Far East brought on by the U.S. response to Chinese Communist bombardment of Nationalist-held offshore islands which the government felt bound to defend, inflation coupled with recession, and even corruption—in connection with the allegations against Sherman Adams (*q.v.*)—the Democratic party regained much of its former popularity. The result was a sweeping Democratic victory in November 1958.

The Republicans experienced their worst defeat since the early days of the New Deal, with the Democrats widening their control from a slim majority (49 to 47) to a position of predominance, 64 to 34, including two new Democratic Senators from Alaska. In the House, Democratic control expanded from a 235-200 margin to 283-153. More striking was the almost complete disappearance—through defeat or retirement—of the right-wing Republican Senators: John W. Bricker, of Ohio; William E. Jenner, of Indiana; William F. Knowland, of California; George W. Malone, of Nevada; and Chapman W. Revercomb, of West Virginia. They were replaced, in most instances, by young liberal Democrats. The only Republican bright spot was in New York, where Nelson A. Rockefeller won the governorship from W. Averell Harriman (*qq.v.*) by a substantial margin.

Yet, despite this impressive victory, the Demo-

crats were able to accomplish little in the way of significant legislation in the 86th Congress. They challenged the Administration's concept of a balanced budget in time of international crisis, but Congress as well as the Administration seemed doubtful as to where the emphasis in military appropriations ought to be placed. The Congress opposed the Administration on some occasions but in general shied away from feuding with a President who was held in the greatest possible esteem by the people. The Senate rejected, for instance, the appointment of former Atomic Energy Commission chairman Lewis L. Strauss (*q.v.*) as Secretary of Commerce after long-drawn-out committee hearings and debate on the floor. With the retirement of 91-year-old Sen. Theodore F. Green, of Rhode Island, as chairman of the Foreign Relations Committee, a more vigorous critic of Republican foreign policy, J. William Fulbright (*q.v.*), appeared on the scene. Fulbright, however, was defeated in his effort to obtain a more professional diplomatic corps (a project later pursued by the Kennedy administration).

In foreign affairs, a Russian-instigated crisis over Berlin led to a foreign-ministers conference at Geneva, Switzerland, in 1959. The U.S.S.R. in November 1958 had proposed that the three Western allies abandon West Berlin in favor of the establishment of what they called a "free city" within six months. To Kremlin threats that the U.S.S.R. would consider itself free of its obligations to its wartime allies in relation to Berlin, the U.S. reacted strongly, making it clear that it would not acquiesce in a unilateral repudiation by the U.S.S.R. of its formally agreed-upon obligations and responsibilities. Before the Big Four foreign ministers met in Geneva on May 11, 1959, Secretary of State Dulles became ill and was forced to resign. Before the conference recessed in a deadlock in June, the four foreign ministers had flown to Washington, D.C., to attend Dulles' funeral. Under Secretary of State Christian A. Herter (*q.v.*) was chosen to head the State Dept.

While Herter won plaudits for his firm presentation of the American position at Geneva, tension between the U.S. and Russia did not abate, despite the opening in July of a Russian trade fair in New York City and an American one in Moscow. First deputy premier Frol R. Kozlov opened the Soviet exhibition, and Vice President Nixon ceremoniously opened the American fair in the Soviet capital. Meanwhile, the recessed talks at Geneva were resumed; but the Russian delegate, Andrei A. Gromyko (*q.v.*), continued to press for a Kremlin solution of the crisis so as to force the West to agree to the holding of a conference of the heads of state of the Big Four powers, which was finally scheduled for May 1960. In order to seek an end to the diplomatic stale-

mate, President Eisenhower and Khrushchev exchanged invitations for visits in Washington and Moscow, respectively. The Russian leader, with his family and a large entourage, arrived in the U.S. in September 1959, touring the country, addressing the U.N. General Assembly in New York City, and discussing the world situation with President Eisenhower in Washington, D.C., and Camp David, the Presidential retreat in Maryland. A return visit of President Eisenhower to Russia was at first planned for late fall but then postponed to the spring of 1960. It never took place, however, because Khrushchev withdrew the invitation during an ill-fated four-power "summit" meeting in Paris in May 1960. Many East-West problems awaited solution at that time, including the stalled disarmament talks in Geneva and negotiations to reach an agreement on an atom-test ban. Khrushchev, however, made a *cause célèbre* of the downing of an American U-2 plane (equipped to take aerial photographs) during an admitted espionage flight (May 1) over the U.S.S.R. and ended the meeting before it had really started. This and other incidents, such as the shooting down by Russia, on July 1, of an Air Force reconnaissance bomber (RB-47)—allegedly over Soviet territory—and the intensification of the Berlin crisis by the Communists, aggravated the cold war during the ending months of the President's term. Among other problems, the birth of almost a score of newly independent countries in Africa and, especially, the civil strife that followed the liberation from colonial rule of the Belgian Congo brought the U.S. up against Soviet attempts to communize a continent vital to American interests.

Major U.S. domestic problems in 1959 and 1960 were economic. The deficit for the fiscal year ending June 30, 1959, stood at almost \$13,000,000,000—a record peacetime figure. At the President's request, Congress raised (June) the temporary debt ceiling from \$288,000,000,000 to \$295,000,000,000. This move, and the debate in Congress over the President's insistence on balancing the 1960 and 1961 budgets, were related to the politically explosive issue of inflation. A steel strike, which began on July 15, 1959, developed into the longest work stoppage this industry had yet experienced; it was interrupted only by a Taft-Hartley injunction granted on Nov. 7. On Jan. 4, 1960, however, the parties signed a new two-year contract which included wage raises without immediate price increases. Nevertheless, the number of both the employed and the unemployed reached high figures. In October 1959, 66,831,000 persons were employed and 3,272,000 unemployed; in November 1960—with the labor force steadily increasing—67,182,000 were employed but 4,013,000 unemployed, reflecting a mild economic stagnation during the latter year. Average weekly earn-

ings, however, increased from \$84.35 in 1958 to \$88.70 in 1959 and to \$90.78 in 1960 (at different months of these years). At the same time, the Eisenhower administration achieved surpluses in the 1960 (\$1,224,000,000) and 1961 (*ca.* \$79,000,000) budgets.

The farm problem remained a cause of concern. Farm income was low (1958, \$38,216,000,000; 1959, \$37,467,000,000; 1960, \$37,940,000,000), especially when it was compared with other components of the national income. Surpluses and government costs in the field rose.

The Supreme Court, which had been under criticism since 1954 for its decisions ending (in phases) segregation in schools, in 1959 invalidated the industrial security program of the Dept. of Defense. For these and other decisions, the American Bar Assn. in effect censured the court in 1959. It was evident that under the Eisenhower-appointed chief justice, Earl Warren (*q.v.*), the court put greater emphasis on the Bill of Rights and the civil liberties it guarantees than on national security, apparently holding that neither could flourish without the other.

The civil-rights front was marked by the greater willingness of Negroes to fight for their constitutional rights. Two laws were enacted in 1957 and 1960, the first aimed at ensuring voting rights and establishing a Commission on Civil Rights, the second further stressing the right of Negroes to register and vote. School desegregation made progress, and some advances were recorded in public transportation and public eating places. Negro "sit-in" demonstrations and the so-called freedom riders (white and colored persons under the leadership of clergymen) probably influenced the pace of such advances, which, however, were sometimes accompanied by bloodshed and strong legal opposition.

The field of education, too, received national attention. Classrooms were bulging, but most communities, the states, and the Federal government were unable to raise necessary funds to provide adequate classroom space and better salaries for more qualified teachers. College and university faculties debated whether to put greater emphasis on science; in the secondary schools, however, science was receiving more attention. The Federal government, beginning in 1958, made some effort to relieve the situation with the passage of the National Defense Education Act, in order to "... assist in the expansion and improvement of educational programs to meet critical national needs."

KENNEDY AND JOHNSON ADMINISTRATIONS. In 1960 the Democrats nominated Sen. John F. Kennedy for President and Sen. Lyndon B. Johnson (*qq.v.*) for Vice President. The Republicans nominated Vice President Richard M. Nixon for President and Henry Cabot Lodge (*qq.v.*) for Vice

President. The campaign was energetically fought by both sides; a highlight was a series of television debates between the candidates, the first time in a Presidential contest that the electorate was able literally to gain a "picture" of the opponents. The Democrats won with a 303-to-219 electoral vote but a plurality of only 112,881 votes. Kennedy became the first Roman Catholic to be elected President. The Democrats held the Senate by 64 to 36 seats and the House by 262 to 175.

After his inauguration on Jan. 20, 1961, which was highlighted by an eloquent and moving Inaugural Address, President Kennedy surrounded himself with a cabinet and a group of aides made up primarily of younger intellectuals who had not held government positions before. His reflectiveness and knowledge of history and the university-faculty background of his aides lent themselves to a different approach to domestic and world problems from the political and business orientation of more recent Administrations.

During the three years President Kennedy held office, his domestic legislative program was based on his 1960 campaign promise "to get the nation moving" again. It included such items as aid to depressed areas, plans to reduce agricultural overproduction and stockpiling, compulsory health insurance for the aged, and aid to education and housing. Although all of the proposals were discussed by the nation at large, not all of them were passed by the Congress; and those which Congress did accept were passed on a much more modest scale than had been suggested by the President. In addition to his compulsory health insurance for the aged, which Congress rejected, his two most controversial socioeconomic bills—an income-tax cut and business incentive program, and far-reaching measures to bar racial inequality—were introduced into Congress in 1963 and were being debated at the time of his death (Nov. 22, 1963).

Probably the most enduring and widely admired measure inaugurated by President Kennedy was the Peace Corps, composed of American volunteers to offer "people-to-people" aid to underdeveloped nations. It was established by Presidential action on March 1, 1961, and approved by Congress as a semiautonomous agency within the State Dept. in the following September.

President Kennedy's New Frontier course—so called from a phrase in his speech accepting the nomination at Los Angeles, Calif., on July 15, 1960—faced many obstacles and much opposition. The business community questioned the urgency and scope of some of his policies and cited them as signs of his antibusiness inclination. A notable example was his forceful stand against a price increase in the steel industry in 1962 and the subsequent decrease in the value of stocks, reminiscent of the 1929 stock-exchange crash. The President frequently rejected this assumption, and at the end

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of his life he seemed to have succeeded in erasing this image of his Administration.

The U.S., in these years, expanded its space programs (see *Astronautics*). President Kennedy's insistence that the U.S. land a man on the moon by 1970 was not shared by the large section of the U.S. that was economy-minded, but his dream of the future was recognized by his successor when he renamed (Nov. 28, 1963) the huge Florida space installations of N.A.S.A. the John F. Kennedy Space Center and changed the name of Cape Canaveral (*q.v.*) to Cape Kennedy.

As the economic situation improved and the annual growth rate edged forward—though slowly—with record employment figures but constant high unemployment (*ca.* 5.5 per cent of the labor force), the electorate was ready to give the Kennedy administration a vote of confidence in November 1962. The Democrats gained four seats in the Senate and lost only four seats in the House, contrary to the historic pattern that the party in power loses strength in midterm elections; nevertheless, the new Congress took on a more conservative aspect, which prevented full support of the President's program in 1963.

In the same way that President Kennedy committed himself to break the streak of violence that had become almost national in recent years and had cost many lives, so he endeavored to accomplish an East-West rapprochement. From the outset he stressed the need for defense capabilities second to none, but also negotiations to arrive at a common ground. The Russians apparently held the same views and to ease the path of conciliation released in January 1961 the surviving airmen of the RB-47 plane they had previously shot down; nevertheless they increased their pressure on West Berlin. President Kennedy held many conferences with foreign statesmen, including one with Nikita S. Khrushchev, the Soviet premier, in Vienna, Austria, in June 1961. This meeting followed a foreign reversal for the U.S.—in Cuba (*q.v.*), where anti-Castro exiles, with at least tacit Washington approval, attempted an invasion with inadequate forces and were defeated.

Castro's seizure of power in Cuba on Jan. 1, 1959, had presented the U.S. with the greatest international problem since the end of the Korean conflict. With photographic evidence of Soviet missile emplacements in Cuba, President Kennedy in October 1962 threw a naval quarantine around the island and warned the U.S.S.R. to ship no more offensive military equipment and to remove the missiles and jets already there. This was the first firm challenge to Soviet aggression since the cold war began in the mid-1940's. When the Russians complied, the quarantine of Cuba was lifted.

Although the political opposition continued to dispute President Kennedy's statement that the Cuban situation was no longer dangerous to U.S.



THE 35TH AND THE 36TH PRESIDENTS

John F. Kennedy (*left*) and Lyndon B. Johnson

security, his forceful stand opened the way to an East-West *détente* which was most apparent in the signing of a limited nuclear test ban treaty (Aug. 5, 1963) by Great Britain, the U.S., and the U.S.S.R. The treaty, which was later signed by the great majority of all nations, was opposed by the governments of China, which continued its adamant opposition to the U.S., and of France, which fretted over U.S. primacy in nuclear strength and its leading role in N.A.T.O. Another foreign-policy measure that may be considered a Kennedy success was the "Alliance for Progress" organization of American nations embodying U.S. aid to Latin-American economies.

At the time of President Kennedy's assassination in Dallas, Texas, allegedly by 24-year-old Lee Harvey Oswald, the world seemed generally in a more tranquil state than when he took office, although the U.S. foreign policy faced problems in many areas (Viet Nam, for instance, where the U.S.-aided fight against Communist guerrillas cost many American lives). Nevertheless, in President Johnson's words to the nation five days after he was sworn into office as 36th President (at 2:39 P.M., Nov. 22), the U.S. had "demonstrated that it has the courage to seek peace and it has the fortitude to risk war."

President Johnson subsequently committed himself to continuation of Kennedy's domestic and foreign policies of conciliation.

Jacqueline Kennedy was a dynamic and colorful First Lady during the few years her husband held office. She enjoyed great personal triumphs on her visits to France, India, and Latin America. Her fortitude after the assassination (which she witnessed, since she had accompanied her husband on his quasi-political tour to Texas) and throughout the days of funeral ceremonies and burial endeared her not only to all Americans but to the hundreds of statesmen who journeyed to Washington to pay their nations' respects to the 35th President of the U.S.

United States, CONSTITUTION OF THE, the basic or fundamental law of the U.S. of America. It is the organic law that unites the states and binds them into a perpetual Union. All the laws of the nation and of the several states are subordinate to the Constitution of the U.S., and any law made by a legislative body within its jurisdiction must be in accord with the basic law, otherwise it is void and inoperative. The Constitution is preceded by the preamble and consists of seven original articles and 23 articles of amendment. It was adopted on Sept. 17, 1787, by a Constitutional Convention held in Independence Hall, Philadelphia, and went into effect on Mar. 4, 1789. The full text is as follows:

We, the people of the United States, in order to form a more perfect Union, establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity, do ordain and establish this Constitution for the United States of America.

ARTICLE I.—SECTION 1.—All legislative powers herein granted shall be vested in a Congress of the United States, which shall consist of a Senate and House of Representatives.

SEC. 2.—The House of Representatives shall be composed of members chosen every second year by the people of the several States, and electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

No person shall be a Representative who shall not have attained the age of 25 years, and been seven years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State in which he shall be chosen.

Representatives and direct taxes shall be apportioned among the several States which may be included within this Union, according to their respective numbers, which shall be determined by adding to the whole number of free persons, including those bound to service for a term of years, and excluding Indians not taxed, three-fifths of all other persons. The actual enumeration shall be made within three years after the first meeting of the Congress of the United States, and within every subsequent term of ten years, in such manner as they shall by law direct. The number of Representatives shall not exceed one for every thirty thousand; but each State shall have at least one representative; and until such enumeration shall be made, the State of New Hampshire shall be entitled to choose three; Massachusetts, eight; Rhode Island and Providence Plantations, one; Connecticut, five; New York, six; New Jersey, four; Pennsylvania, eight; Delaware, one; Maryland, six; Virginia, ten; North Carolina, five; South Carolina, five; and Georgia, three.

When vacancies happen in the representation from any State, the Executive Authority thereof shall issue writs of election to fill such vacancies.

The House of Representatives shall choose their Speaker and other officers, and shall have the sole power of impeachment.

SEC. 3.—The Senate of the United States shall be composed of two Senators from each State, chosen by the Legislature thereof, for six years; and each Sena-

tor shall have one vote.

Immediately after they shall be assembled in consequence of the first election, they shall be divided, as equally as may be, into three classes. The seats of the Senators of the first class shall be vacated at the expiration of the second year, of the second class, at the expiration of the fourth year, and of the third class, at the expiration of the sixth year, so that one-third may be chosen every second year; and if vacancies happen, by resignation or otherwise, during the recess of the Legislature of any State, the Executive thereof may make temporary appointments until the next meeting of the Legislature, which shall then fill such vacancies.

No person shall be a Senator who shall not have attained to the age of 30 years, and been nine years a citizen of the United States, and who shall not, when elected, be an inhabitant of that State for which he shall be chosen.

The Vice President of the United States shall be President of the Senate, but shall have no vote unless they be equally divided.

The Senate shall choose their other officers, and also a president *pro tempore*, in the absence of the Vice President, or when he shall exercise the office of the President of the United States.

The Senate shall have the sole power to try all impeachments. When sitting for that purpose, they shall be on oath or affirmation. When the President of the United States is tried, the Chief Justice shall preside; and no person shall be convicted without the concurrence of two-thirds of the members present.

Judgment, in cases of impeachment, shall not extend further than to removal from office, and disqualification to hold and enjoy any office of honor, trust, or profit under the United States; but the party convicted shall, nevertheless, be liable and subject to indictment, trial, judgment, and punishment, according to law.

SEC. 4.—The times, places, and manner of holding elections for Senators and Representatives shall be prescribed in each State by the Legislature thereof; but the Congress may, at any time, by law, make or alter such regulations, except as to places of choosing Senators.

The Congress shall assemble at least once in every year; and such meeting shall be on the first Monday in December, unless they shall by law appoint a different day.

SEC. 5.—Each House shall be the judge of the elections, returns, and qualifications of its own members; and a majority of each shall constitute a quorum to do business; but a smaller number may adjourn from day to day, and may be authorized to compel the attendance of absent members, in such manner and under such penalties as each House may provide.

Each House may determine the rules of its proceedings, punish its members for disorderly behavior, and with the concurrence of two-thirds, expel a member.

Each House shall keep a journal of its proceedings, and from time to time publish the same, excepting such parts as may in their judgment require secrecy; and the yeas and nays of the members of either House on any question, shall, at the desire of one-fifth of those present, be entered on the journal.

Neither House, during the session of Congress, shall, without the consent of the other, adjourn for more than three days, nor to any other place than that in which the two Houses shall be sitting.

SEC. 6.—The Senators and Representatives shall receive a compensation for their services, to be ascertained by law, and paid out of the Treasury of the United States. They shall in all cases, except treason, felony, and breach of the peace, be privileged from arrest during their attendance at the session of their respective Houses, and in going to and returning from the same; and, for any speech or debate in either House, they shall not be questioned in any other place.

No Senator or Representative shall, during the time for which he was elected, be appointed to any civil office under the authority of the United States which shall have been created, or the emoluments whereof shall have been increased, during such time; and no person holding any office under the United States shall be a member of either House during his continuance in office.

SEC. 7.—All bills for raising revenues shall originate in the House of Representatives; but the Senate may propose or concur with amendments, as on other bills.

Every bill which shall have passed the House of Representatives and the Senate, shall, before it becomes a law, be presented to the President of the United States; if he approve he shall sign it, but if not, he shall return it, with his objections, to that House in which it shall have originated, who shall enter the objections at large on their journal, and proceed to reconsider it. If after such reconsideration, two-thirds of that House shall agree to pass the bill, it shall be sent, together with the objections, to the other House, by which it shall likewise be reconsidered, and, if approved by two-thirds of that House, it shall become a law. But in all such cases, the votes of both Houses shall be determined by yeas and nays; and the names of the persons voting for and against the bill shall be entered on the journal of each House respectively. If any bill shall not be returned by the President within ten days (Sundays excepted) after it shall have been presented to him, the same shall be a law in like manner as if he had signed it, unless the Congress by their adjournment prevent its return, in which case it shall not be a law.

Every order, resolution, or vote, to which the concurrence of the Senate and House of Representatives may be necessary (except on a question of adjournment), shall be presented to the President of the United States; and, before the same shall take effect, shall be approved by him, or, being disapproved by him, shall be repassed by two-thirds of the Senate and House of Representatives, according to the rules and limitations prescribed in the case of a bill.

SEC. 8.—The Congress shall have power:

To lay and collect taxes, duties, imposts, and excises, to pay the debts, and provide for the common defense and general welfare of the United States; but all duties, imposts, and excises shall be uniform throughout the United States;

To borrow money on the credit of the United States;

To regulate commerce with foreign nations, and among the several States, and with the Indian tribes;

To establish a uniform rule of naturalization, and uniform laws on the subject of bankruptcies throughout the United States;

To coin money, regulate the value thereof, and of foreign coin, and fix the standard of weights and measures;

To provide for the punishment of counterfeiting the securities and current coin of the United States;

To establish post offices and post roads;

To promote the progress of science and useful arts, by securing for limited times to authors and inventors the exclusive right to their respective writings and discoveries;

To constitute tribunals inferior to the Supreme Court;

To define and punish piracies and felonies committed on the high seas, and offenses against the law of nations;

To declare war, grant letters of marque and reprisal, and make rules concerning captures on land and water;

To raise and support armies; but no appropriation of money to that use shall be for a longer term than two years;

To provide and maintain a navy;

To make rules for the government and regulation of the land and naval forces;

To provide for calling forth the militia to execute the laws of the Union, suppress insurrections, and repel invasions;

To provide for organizing, arming, and disciplining the militia, and for governing such part of them as may be employed in the service of the United States, reserving to the States respectively the appointment of the officers, and the authority of training the militia according to the discipline prescribed by Congress;

To exercise exclusive legislation, in all cases whatsoever, over such district (not exceeding ten miles square) as may, by cession of particular States and the acceptance of Congress, become the seat of government of the United States, and to exercise like authority over all places purchased by the consent of the Legislature of the States in which the same shall be, for the erection of forts, magazines, arsenals, dockyards, and other needful buildings;—And

To make all laws which shall be necessary and proper for carrying into execution the foregoing powers, and all other powers vested by this Constitution in the government of the United States, or in any department or officer thereof.

SEC. 9.—The migration or importation of such persons as any of the States now existing shall think proper to admit shall not be prohibited by the Congress prior to the year one thousand eight hundred and eight; but a tax, or duty, may be imposed on such importation, not exceeding ten dollars for each person.

The privilege of the writ of *habeas corpus* shall not be suspended, unless when in cases of rebellion or invasion the public safety may require it.

No bill of attainder or *ex post facto* law shall be passed.

No capitation or other direct tax shall be laid, unless in proportion to the census, or enumeration, hereinbefore directed to be taken.

No tax or duty shall be laid on articles exported from any State.

No preference shall be given by any regulation of commerce or revenue to the ports of one State over those of another; nor shall vessels bound to or from one State be obliged to enter, clear, or pay duties, to another.

No money shall be drawn from the Treasury but in consequence of appropriations made by law; and a regular statement and account of the receipts and expenditures of all public money shall be published from time to time.

No title of nobility shall be granted by the United

States; and no person holding any office of profit or trust under them shall, without the consent of the Congress, accept of any present, emolument, office, or title of any kind whatever, from any king, prince, or foreign state.

SEC. 10.—No State shall enter into any treaty, alliance, or confederation, grant letters of marque and reprisal, coin money, emit bills of credit, make anything but gold and silver coin a tender in payment of debts, pass any bill of attainder, *ex post facto* law, or law impairing the obligation of contracts, or grant any title of nobility.

No State shall, without the consent of the Congress, lay any imposts or duties on imports or exports, except what may be absolutely necessary for executing its inspection laws; and the net produce of all duties and imposts laid by any State on imports or exports, shall be for the use of the Treasury of the United States; and all such laws shall be subject to the revision and control of the Congress.

No State shall without the consent of Congress, lay any duty of tonnage, keep troops or ships of war in time of peace, enter into any agreement or compact with another State or with a foreign power, or engage in war, unless actually invaded, or in such imminent danger as will not admit of delay.

ARTICLE II. SECTION 1.—The Executive Power shall be vested in a President of the United States of America. He shall hold his office during the term of four years, and together with the Vice President, chosen for the same term, be elected as follows:

Each State shall appoint, in such manner as the Legislature thereof may direct, a number of electors equal to the whole number of Senators and Representatives to which the State may be entitled in the Congress; but no Senator or Representative, or person holding an office of trust or profit under the United States, shall be appointed an elector.

The electors shall meet in their respective States and vote by ballot for two persons, of whom one at least shall not be an inhabitant of the same State with themselves. And they shall make a list of all the persons voted for, and of the number of votes for each; which list they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the President of the Senate. The President of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates; and the votes shall then be counted. The person having the greatest number of votes shall be the President, if such number be a majority of the whole number of electors appointed; and if there be more than one who have such majority, and have an equal number of votes, then the House of Representatives shall immediately choose, by ballot, one of them for President; and if no person have a majority, then, from the five highest on the list, the said House shall, in like manner, choose the President. But, in choosing the President, the votes shall be taken by States; the representation from each State having one vote. A quorum for this purpose shall consist of a member or members from two-thirds of the States; and a majority of all the States shall be necessary to a choice. In every case, after the choice of the President, the person having the greatest number of votes of the electors shall be the Vice President. But if there should remain two or more who have equal votes, the Senate shall choose from them, by ballot, the Vice

President. [This clause has now been superseded by Amendment XII.]

The Congress may determine the time of choosing the electors, and the day on which they shall give their votes, which day shall be the same throughout the United States.

No person, except a natural born citizen, or a citizen of the United States at the time of the adoption of this Constitution, shall be eligible to the office of President; neither shall any person be eligible to that office who shall not have attained to the age of 35 years, and been 14 years a resident within the United States.

In case of the removal of the President from office, or of his death, resignation, or inability to discharge the powers and duties of the said office, the same shall devolve on the Vice President; and the Congress may, by law, provide for the case of removal, death, resignation, or inability, both of the President and Vice President, declaring what officer shall then act as President; and such officer shall act accordingly, until the disability be removed, or a President shall be elected.

The President shall, at stated times, receive for his services a compensation, which shall neither be increased nor diminished during the period for which he shall have been elected; and he shall not receive within that period any other emolument from the United States, or any of them.

Before he enter on the execution of his office, he shall take the following oath or affirmation:

"I do solemnly swear (or affirm) that I will faithfully execute the office of President of the United States and will, to the best of my ability, preserve, protect, and defend the Constitution of the United States."

SEC. 2.—The President shall be Commander-in-Chief of the Army and Navy of the United States, and of the militia of the several States, when called into the actual service of the United States; he may require the opinion, in writing, of the principal officer in each of the executive departments, upon any subject relating to the duties of their respective affairs, and he shall have power to grant reprieves and pardons for offenses against the United States, except in cases of impeachment.

He shall have power, by and with the advice and consent of the Senate, to make treaties, provided two-thirds of the Senators present concur; and he shall nominate, and by and with the advice and consent of the Senate, shall appoint ambassadors, other public ministers and consuls, judges of the Supreme Court, and all other officers of the United States, whose appointments are not herein otherwise provided for, and which shall be established by law; but the Congress may, by law, vest the appointment of such inferior officers as they think proper, in the President alone, in the courts of law, or in the heads of departments.

The President shall have power to fill up all vacancies that may happen during the recess of the Senate, by granting commissions, which shall expire at the end of their next session.

SEC. 3.—He shall, from time to time, give to the Congress information of the state of the Union, and recommend to their consideration such measures as he shall judge necessary and expedient; he may, on extraordinary occasions, convene both Houses, or either of them, and, in case of disagreement between

them with respect to the time of adjournment, he may adjourn them to such time as he shall think proper; he shall receive ambassadors and other public ministers; he shall take care that the laws be faithfully executed; and shall commission all the officers of the United States.

SEC. 4.—The President, Vice President, and all civil officers of the United States, shall be removed from office on impeachment for and conviction of treason, bribery, or other high crimes and misdemeanors.

ARTICLE III.—SECTION 1.—The judicial power of the United States shall be vested in one Supreme Court, and in such inferior courts as the Congress may from time to time ordain and establish. The judges, both of the Supreme and inferior courts, shall hold their offices during good behavior; and shall, at stated times, receive for their services a compensation which shall not be diminished during their continuance in office.

SEC. 2.—The judicial power shall extend to all cases in law and equity arising under this Constitution, the laws of the United States, and treaties made, or which shall be made, under their authority; to all cases affecting ambassadors, other public ministers and consuls; to all cases of admiralty and maritime jurisdiction; to controversies to which the United States shall be a party; to controversies between two or more States, between a State and citizens of another State, between citizens of different States, between citizens of the same State claiming lands under grants of different States, and between a State, or the citizens thereof, and foreign states, citizens, or subjects.

In all cases affecting ambassadors, other public ministers and consuls, and those in which a State shall be a party, the Supreme Court shall have original jurisdiction. In all the other cases before mentioned, the Supreme Court shall have appellate jurisdiction both as to law and fact, with such exceptions and under such regulations as the Congress shall make.

The trial of all crimes, except in cases of impeachment, shall be by jury; and such trial shall be held in the State where the said crimes shall have been committed; but, when not committed within any State, the trial shall be at such place or places as the Congress may by law have directed.

SEC. 3.—Treason against the United States shall consist only in levying war against them, or in adhering to their enemies, giving them aid and comfort. No person shall be convicted of treason unless on the testimony of two witnesses to the same overt act, or on confession in open court.

The Congress shall have power to declare the punishment of treason, but no attainder of treason shall work corruption of blood or forfeiture, except during the life of the person attainted.

ARTICLE IV.—SECTION 1.—Full faith and credit shall be given in each State to the public acts, records, and judicial proceedings of every other State. And the Congress may by general laws prescribe the manner in which such acts, records, and proceedings shall be proved, and the effect thereof.

SEC. 2.—The citizens of each State shall be entitled to all privileges and immunities of citizens in the several States.

A person charged in any State with treason, felony, or other crime, who shall flee from justice, and be found in another State, shall, on demand of the Executive authority of the State from which he fled, be delivered up, to be removed to the State having jurisdiction of the crime.

No person held to service or labor in one State under the laws thereof, escaping into another, shall, in consequence of any law or regulation therein, be discharged from such service or labor, but shall be delivered up on claim of the party to whom such service or labor may be due.

SEC. 3.—New States may be admitted by the Congress into this Union; but no new State shall be formed or erected within the jurisdiction of any other State; nor any State be formed by the junction of two or more States, or parts of States, without the consent of the Legislatures of the States concerned, as well as of the Congress.

The Congress shall have power to dispose of and make all needful rules and regulations respecting the territory or other property belonging to the United States; and nothing in this Constitution shall be so construed as to prejudice any claims of the United States, or of any particular State.

SEC. 4.—The United States shall guarantee to every State in this Union a republican form of government, and shall protect each of them against invasion; and on application of the Legislature, or of the Executive (when the Legislature cannot be convened), against domestic violence.

ARTICLE V.—The Congress, whenever two-thirds of both Houses shall deem it necessary, shall propose amendments to this Constitution: or, on the application of the Legislatures of two-thirds of the several States, shall call a convention for proposing amendments, which, in either case, shall be valid to all intents and purposes, as part of this Constitution, when ratified by the Legislatures of three-fourths of the several States, or by conventions in three-fourths thereof, as the one or the other mode of ratification may be proposed by the Congress; provided, that no amendment which may be made prior to the year one thousand eight hundred and eight shall in any manner affect the first and fourth clauses in the ninth section of the first article; and that no State, without its consent, shall be deprived of its equal suffrage in the Senate.

ARTICLE VI.—All debts contracted, and engagements entered into, before the adoption of this Constitution, shall be as valid against the United States under this Constitution, as under the confederation.

This Constitution, and the laws of the United States which shall be made in pursuance thereof, and all treaties made, or which shall be made, under the authority of the United States, shall be the supreme law of the land; and the judges in every State shall be bound thereby, anything in the Constitution or laws of any State to the contrary notwithstanding.

The Senators and Representatives before mentioned, and the members of the several State Legislatures, and all executives and judicial officers, both of the United States and of the several States, shall be bound by oath or affirmation to support this Constitution; but no religious test shall ever be required as a qualification to any office or public trust under the United States.

ARTICLE VII.—The ratification of the Conventions of nine States shall be sufficient for the establishment of this Constitution between the States so ratifying the same.

Done in convention by the unanimous consent of the States present, the seventeenth day of September, in the year of our Lord one thousand seven hundred and eighty-seven, and of the independence of the United States of America the twelfth. In witness

Congress of the United States.

begun and held at the City of New York,
on Wednesday the fourth of March one thousand seven hundred and eighty nine



FREEDOM OF RELIGION



FREEDOM OF SPEECH



FREEDOM FROM UNREASONABLE SEARCHES



RIGHT TO ASSEMBLE



RIGHT TO PETITION

SOME HIGHLIGHTS OF THE BILL OF RIGHTS



RIGHT TO JURY TRIAL AND COUNSEL



RIGHT TO SUMMON WITNESSES



NO ILLEGAL LOSS OF LIBERTY



NO EXCESSIVE BAIL OR FINES



JUST COMPENSATION FOR PROPERTY

Chart by Graphics Institute, N. Y. C.

THE FIRST TEN AMENDMENTS ARE KNOWN AS THE BILL OF RIGHTS

whereof we have hereunto subscribed our names.

GEORGE WASHINGTON, President
and Deputy from Virginia.

NEW HAMPSHIRE: John Langdon, Nicholas Gilman.—MASSACHUSETTS: Nathaniel Gorham, Rufus King.—CONNECTICUT: William Samuel Johnson, Roger Sherman.—NEW YORK: Alexander Hamilton.—NEW JERSEY: William Livingston, David Bearley, William Patterson, Jonathan Dayton.—PENNSYLVANIA: Benjamin Franklin, Thomas Mifflin, Robert Morris, George Clymer, Thomas Fitzsimons, Jared Ingersoll, James Wilson, Gouverneur Morris.—DELAWARE: George Read, Gunning Bedford, Jr., John Dickinson, Richard Bassett, Jacob Broom.—MARYLAND: James McHenry, Daniel of St. Thomas Jenifer, Daniel Carroll.—VIRGINIA: John Blair, James Madison, Jr.—NORTH CAROLINA: William Blount, Richard Dobbs Spaight, Hugh Williamson.—SOUTH CAROLINA: John Rutledge, Charles Cotesworth Pinckney, Charles Pinckney, Pierce Butler.—GEORGIA: William Few, Abraham Baldwin.—Attest: WILLIAM JACKSON, Secretary.

AMENDMENTS TO THE CONSTITUTION

ARTICLE I.—Congress shall make no law respecting an establishment of religion, or prohibiting the free exercise thereof; or abridging the freedom of speech or of the press; or the right of the people peaceably to assemble and to petition the government for a redress of grievances.

ARTICLE II.—A well-regulated militia being necessary to the security of a free State, the right of the people to keep and bear arms shall not be infringed.

ARTICLE III.—No soldier shall, in time of peace, be quartered in any house without the consent of the

owner; nor in time of war, but in a manner to be prescribed by law.

ARTICLE IV.—The right of the people to be secure in their persons, houses, papers, and effects, against unreasonable searches and seizures, shall not be violated; and no warrants shall issue but upon probable cause, supported by oath or affirmation, and particularly describing the place to be searched, and the person or things to be seized.

ARTICLE V.—No person shall be held to answer for a capital or otherwise infamous crime unless on a presentment or indictment of a Grand Jury, except in cases arising in the land or naval forces, or in the militia when in actual service in time of war or public danger; nor shall any person be subject, for the same offense, to be twice put in jeopardy of life or limb; nor shall be compelled, in any criminal case, to be a witness against himself; nor be deprived of life, liberty, or property, without due process of law; nor shall private property be taken for public use without just compensation.

ARTICLE VI.—In all criminal prosecutions the accused shall enjoy the right to a speedy and public trial, by an impartial jury of the State and district wherein the crime shall have been committed, which district shall have been previously ascertained by law, and to be informed of the nature and cause of the accusation; to be confronted with the witnesses against him; to have compulsory process for obtaining witnesses in his favor; and to have the assistance of counsel for his defense.

ARTICLE VII.—In suits at common law, where the value in controversy shall exceed \$20.00, the right of trial by jury shall be preserved; and no fact tried

by a jury shall be otherwise re-examined in any court of the United States than according to the rules of the common law.

ARTICLE VIII.—Excessive bail shall not be required, nor excessive fines imposed, nor cruel and unusual punishments inflicted.

ARTICLE IX.—The enumeration in the Constitution of certain rights shall not be construed to deny or disparage others retained by the people.

ARTICLE X.—The powers not delegated to the United States by the Constitution, nor prohibited by it to the States, are reserved to the States respectively, or to the people.

ARTICLE XI.—The judicial power of the United States shall not be construed to extend to any suit in law or equity, commenced or prosecuted against any of the United States, by citizens of another State, or by citizens or subjects of any foreign state.

ARTICLE XII.—The electors shall meet in their respective States, and vote by ballot for President and Vice President, one of whom, at least, shall not be an inhabitant of the same State with themselves; they shall name in their ballots the person voted for as President, and in distinct ballots the person voted for as Vice President; and they shall make distinct lists of all persons voted for as President, and of all persons voted for as Vice President, and of the number of votes for each, which lists they shall sign and certify, and transmit sealed to the seat of the government of the United States, directed to the president of the Senate; the president of the Senate shall, in the presence of the Senate and House of Representatives, open all the certificates, and the votes shall then be counted; the person having the greatest number of votes for President shall be the President, if such number be a majority of the whole number of electors appointed; and if no person have such majority, then from the persons having the highest numbers, not exceeding three on the list of those voted for as President, the House of Representatives shall choose immediately, by ballot, the President. But, in choosing the President, the votes shall be taken by States, the representation from each State having one vote; a quorum for this purpose shall consist of a member or members from two-thirds of the States, and a majority of all the States shall be necessary to a choice. And if the House of Representatives shall not choose a President, whenever the right of choice shall devolve upon them, before the fourth day of March next following, then the Vice President shall act as President, as in the case of death or other constitutional disability of the President.

The person having the greatest number of votes as Vice President shall be the Vice President, if such number be a majority of the whole number of electors appointed; and if no person have a majority, then from the two highest numbers on the list, the Senate shall choose the Vice President; a quorum for the purpose shall consist of two-thirds of the whole number of Senators, and a majority of the whole number shall be necessary to a choice. But no person constitutionally ineligible to the office of President, shall be eligible to that of Vice President of the United States.

ARTICLE XIII.—SECTION I.—Neither slavery nor involuntary servitude, except as a punishment for crime, whereof the party shall have been duly convicted, shall exist within the United States, or any place subject to their jurisdiction.

SEC. 2.—Congress shall have power by appropriate

legislation to enforce the provisions of this article.

ARTICLE XIV.—SECTION 1.—All persons born or naturalized in the United States, and subject to the jurisdiction thereof, are citizens of the United States and of the State wherein they reside. No State shall make or enforce any law which shall abridge the privileges or immunities of citizens of the United States; nor shall any State deprive any person of life, liberty, or property, without due process of law, nor deny to any person within its jurisdiction the equal protection of the laws.

SEC. 2.—Representatives shall be apportioned among the several States, according to their respective numbers, counting the whole number of persons in each State, excluding Indians not taxed. But when the right to vote at any election for choice of electors for President and Vice President of the United States, representatives in Congress, the executive and judicial officers of a state, or the members of the Legislature thereof, is denied to any of the male inhabitants of such State, being 21 years of age, and citizens of the United States, or in any way abridged, except for participation in rebellion or other crime, the basis of representation therein shall be reduced in the proportion which the number of such male citizens shall bear to the whole number of male citizens 21 years of age in such State.

SEC. 3.—No person shall be a Senator, or Representative in Congress, or elector of President and Vice President, or hold any office, civil or military, under the United States, or under any State, who, having previously taken an oath as a member of Congress, or as an officer of the United States, or as a member of any State Legislature, or as an executive or judicial officer of any State, to support the Constitution of the United States, shall have engaged in insurrection or rebellion against the same, or given aid or comfort to the enemies thereof; but Congress may, by a vote of two-thirds of each house, remove such disability.

SEC. 4.—The validity of the public debt of the United States, authorized by law, including debts incurred for payment of pensions, and bounties for services in suppressing insurrection or rebellion, shall not be questioned. But neither the United States, nor any State, shall assume or pay any debt or obligation incurred in aid of insurrection or rebellion against the United States, or any claim for the loss of emancipation of any slave; but all such debts, obligations, and claims shall be held illegal and void.

ARTICLE XV.—SECTION 1.—The rights of the citizens of the United States to vote shall not be denied or abridged by the United States, or by any State, on account of race, color, or previous condition of servitude.

SEC. 2.—The Congress shall have power to enforce this article by appropriate legislation.

ARTICLE XVI.—The Congress shall have power to lay and collect taxes on incomes, from whatever sources derived, without apportionment among the several States, and without regard to any census or enumeration.

ARTICLE XVII.—SECTION 1.—The Senate of the United States shall be composed of two Senators from each State, elected by the people thereof, for six years; and each Senator shall have one vote. The electors in each State shall have the qualifications requisite for electors of the most numerous branch of the State Legislature.

SEC. 2.—When vacancies happen in the represen-

tation of any State in the Senate, the Executive authority of such State shall issue writs of election to fill such vacancies: PROVIDED, That the Legislature of any State may empower the Executive thereof to make temporary appointments until the people fill the vacancies by election as the Legislature may direct.

SEC. 3.—This amendment shall not be construed as to affect the election or term of any Senator chosen before it becomes valid as part of the Constitution.

ARTICLE XVIII.—SECTION 1.—After one year from the ratification of this article, the manufacture, sale, or transportation of intoxicating liquors within, the importation thereof into, or the exportation thereof from the United States and all territory subject to the jurisdiction thereof for beverage purposes is hereby prohibited.

SEC. 2.—The Congress and the several States shall have concurrent power to enforce this article by appropriate legislation.

SEC. 3.—This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by the Legislatures of the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

ARTICLE XIX.—SECTION 1.—The right of citizens of the United States to vote shall not be denied or abridged by the United States or by any State on account of sex.

SEC. 2.—The Congress shall have power, by appropriate legislation, to enforce the provisions of this article.

ARTICLE XX.—SECTION 1.—The terms of the President and Vice President shall end at noon on the 20th day of January, and the terms of Senators and Representatives at noon on the 3rd day of January, of the years in which such terms would have ended if this article had not been ratified; and the terms of their successors shall then begin.

SEC. 2.—The Congress shall assemble at least once in every year, and such meeting shall begin at noon on the 3rd day of January, unless they shall by law appoint a different day.

SEC. 3.—If, at the time fixed for the beginning of the term of the President, the President-elect shall have died, the Vice President-elect shall become President. If a President shall not have been chosen before the time fixed for the beginning of his term, or if the President-elect shall have failed to qualify, then the Vice President-elect shall act as President until a President shall have qualified; and the Congress may by law provide for the case wherein neither a President-elect nor a Vice President-elect shall have qualified, declaring who shall then act as President, or the manner in which one who is to act shall be selected, and such person shall act accordingly until a President or Vice President shall have qualified.

SEC. 4.—The Congress may by law provide for the case of the death of any of the persons from whom the House of Representatives may choose a President whenever the right of choice shall have devolved upon them, and for the case of the death of any of the persons from whom the Senate may choose a Vice President whenever the right of choice shall have devolved upon them.

SEC. 5.—Sections 1 and 2 shall take effect on the 15th day of October following the ratification of this article [Oct. 1933].

SEC. 6.—This article shall be inoperative unless it shall have been ratified as an amendment to the Con-

stitution by the Legislatures of three-fourths of the several States within seven years from the date of its submission.

ARTICLE XXI.—SECTION 1.—The eighteenth article of amendment to the Constitution of the United States is hereby repealed.

SEC. 2.—The transportation or importation into any State, Territory or possession of the United States for delivery or use therein of intoxicating liquors, in violation of the laws thereof, is hereby prohibited.

SEC. 3.—This article shall be inoperative unless it shall have been ratified as an amendment to the Constitution by convention in the several States, as provided in the Constitution, within seven years from the date of the submission hereof to the States by the Congress.

ARTICLE XXII.—SECTION 1.—No person shall be elected to the office of the President more than twice, and no person who has held the office of President, or acted as President, for more than two years of a term to which some other person was elected President shall be elected to the office of the President more than once.

SEC. 2.—But this article shall not apply to any person holding the office of President when this article was proposed by the Congress, and shall not prevent any person who may be holding the office of President, or acting as President, during the term within which this article becomes operative from holding the office of President or acting as President during the remainder of such term.

ARTICLE XXIII.—SECTION 1.—The District constituting the seat of Government of the United States shall appoint in such manner as the Congress may direct:

A number of electors of President and Vice President equal to the whole number of Senators and Representatives in Congress to which the District would be entitled if it were a State, but in no event more than the least populous State; they shall be in addition to those appointed by the States, but be considered, for the purposes of the election of President and Vice President, to be electors appointed by a State; and they shall meet in the District and perform such duties as provided by the twelfth article of amendment.

SEC. 2.—The Congress shall have power to enforce this article by appropriate legislation.

United States, DECLARATION OF INDEPENDENCE, the declaration which severed the 13 American colonies from Great Britain. Although the Second Continental Congress had declared against the formation of an independent government (1775), a congressional committee consisting of Thomas Jefferson, John Adams, Benjamin Franklin, Roger Sherman, and Robert R. Livingston was appointed (June 10, 1776) to draw up a declaration of independence. A draft, written by Jefferson, was presented on June 28, and on July 2 the colonies were declared free and independent by resolution. The Declaration of Independence, with only a few changes from the original draft, was formally passed on July 4. John Hancock was president of the Congress, and the Declaration was signed by him and the representatives from the different colonies. The text follows:

When, in the course of human events, it becomes necessary for one people to dissolve the political bands which have connected them with another, and

to assume among the powers of the earth, the separate and equal station to which the laws of Nature and of Nature's God entitle them, a decent respect to the opinions of mankind requires that they should declare the causes which impel them to the separation.

We hold these truths to be self-evident:—that all men are created equal, that they are endowed by their Creator with certain inalienable rights, that among these are life, liberty, and the pursuit of happiness. That to secure these rights, governments are instituted among men, deriving their just powers from the consent of the governed; that, whenever any form of government becomes destructive of these ends, it is the right of the people to alter or abolish it, and to institute new government, laying its foundation on such principles and organizing its powers in such form, as to them shall seem most likely to effect their safety and happiness. Prudence, indeed, will dictate that governments long established should not be changed for light and transient causes; and accordingly all experience hath shown, that mankind are more disposed to suffer, while evils are sufferable, than to right themselves by abolishing the forms to which they are accustomed. But when a long train of abuses and usurpations, pursuing invariably the same object, evinces a design to reduce them under absolute despotism, it is their right, it is their duty, to throw off such government, and to provide new guards for their future security. Such has been the patient sufferance of these colonies; and such is now the necessity which constrains them to alter their former systems of government. The history of the present King of Great Britain is a history of repeated injuries and usurpations, all having in direct object the establishment of an absolute tyranny over these States. To prove this, let facts be submitted to a candid world.

He has refused his assent to laws, the most wholesome and necessary for the public good.

He has forbidden his governors to pass laws of immediate and pressing importance, unless suspended in their operation till his assent should be obtained; and when so suspended, he has utterly neglected to attend to them.

He has refused to pass other laws for the accommodation of large districts of people, unless those people would relinquish the right of representation in the legislature, a right inestimable to them and formidable to tyrants only.

He has called together legislative bodies at places unusual, uncomfortable, and distant from the depository of their public records, for the sole purpose of fatiguing them into compliance with his measures.

He has dissolved representative houses repeatedly, for opposing with manly firmness his invasions on the rights of the people.

He has refused for a long time, after such dissolutions, to cause others to be elected; whereby the legislative powers, incapable of annihilation, have returned to the people at large for their exercise; the state remaining in the meantime exposed to all the dangers of invasion from without, and convulsions within.

He has endeavored to prevent the population of these States; for that purpose obstructing the laws for naturalization of foreigners; refusing to pass others to encourage their migrations hither, and raising the conditions of new appropriations of lands.

He has obstructed the administration of justice, by refusing his assent to laws for establishing judiciary powers.

He has made judges dependent on his will alone,

for the tenure of their offices, and the amount and payment of their salaries.

He has erected a multitude of new offices, and sent hither swarms of officers to harass our people, and eat out their substance.

He has kept among us, in times of peace, standing armies without the consent of our legislatures.

He has affected to render the military independent of, and superior to, the civil power.

He has combined with others to subject us to a jurisdiction foreign to our constitution, and unacknowledged by our laws; giving his assent to their acts of pretended legislation: For quartering large bodies of armed troops among us: For protecting them, by a mock trial, from punishment for any murders which they should commit on the inhabitants of these States: For cutting off our trade with all parts of the world: For imposing taxes on us without our consent: For depriving us, in many cases, of the benefits of trial by jury: For transporting us beyond seas to be tried for pretended offenses: For abolishing the free system of English laws in a neighboring province, establishing therein an arbitrary government, and enlarging its boundaries so as to render it at once an example and fit instrument for introducing the same absolute rule into these colonies: For taking away our charters, abolishing our most valuable laws, and altering fundamentally the forms of our governments: For suspending our own legislatures, and declaring themselves invested with power to legislate for us in all cases whatsoever.

He has abdicated government here, by declaring us out of his protection and waging war against us.

He has plundered our seas, ravaged our coasts, burnt our towns, and destroyed the lives of our people.

He is at this time transporting large armies of foreign mercenaries to complete the works of death, desolation, and tyranny, already begun with circumstances of cruelty and perfidy scarcely paralleled in the most barbarous ages, and totally unworthy the head of a civilized nation.

He has constrained our fellow citizens taken captive on the high seas to bear arms against their country, to become the executioners of their friends and brethren, or to fall themselves by their hands.

He has excited domestic insurrections amongst us, and has endeavored to bring on the inhabitants of our frontiers the merciless Indian savages, whose known rule of warfare is an undistinguished destruction of all ages, sexes, and conditions.

In every stage of these oppressions we have petitioned for redress in the most humble terms. Our repeated petitions have been answered only by repeated injury. A prince whose character is thus marked by every act which may define a tyrant, is unfit to be the ruler of a free people.

Nor have we been wanting in attention to our British brethren. We have warned them from time to time of attempts by their legislature to extend an unwarrantable jurisdiction over us. We have reminded them of the circumstances of our emigration and settlement here. We have appealed to their native justice and magnanimity, and we have conjured them by the ties of our common kindred to disavow these usurpations, which would inevitably interrupt our connections and correspondence. They too have been deaf to the voice of justice and of consanguinity. We must, therefore, acquiesce in the necessity which denounces our separation, and hold them, as we hold the rest of mankind, enemies in war, in peace friends.

We, therefore, the representatives of the United States of America, in general Congress assembled, appealing to the Supreme Judge of the world for the rectitude of our intentions, do, in the name, and by the authority of the good people of these colonies, solemnly publish and declare, That these united colonies are, and of right ought to be free and independent states; that they are absolved from all allegiance to the British crown, and that all political connection between them and the state of Great Britain, is and ought to be totally dissolved; and that as free and independent states, they have full power to levy war, conclude peace, contract alliances, establish commerce, and to do all other acts and things which independent states may of right do. And for the support of this declaration, with a firm reliance on the protection of Divine Providence, we mutually pledge to each other our lives, our fortunes, and our sacred honor.

JOHN HANCOCK.

CONNECTICUT: Roger Sherman, Samuel Huntington, William Williams, Oliver Wolcott.

NEW YORK: Wm. Floyd, Philip Livingston, Francis Lewis, Lewis Morris.

DELAWARE: Caesar Rodney, Geo. Read, Tho. M'Kean.

GEORGIA: Button Gwinnett, Lyman Hall, Geo. Walton.

MARYLAND: Samuel Chase, Wm. Paca, Thos. Stone, Charles Carroll, of Carrollton.

MASSACHUSETTS BAY: Samuel Adams, John Adams, Robt. Treat Paine, Elbridge Gerry.

NEW HAMPSHIRE: Josiah Bartlett, William Whipple, Matthew Thornton.

NEW JERSEY: Richd. Stockton, Jno. Witherspoon, Francis Hopkinson, John Hart, Abraham Clark.

NORTH CAROLINA: William Hooper, Joseph Hewes, John Penn.

PENNSYLVANIA: Robt. Morris, Benjamin Rush, Benjamin Franklin, John Morton, Geo. Clymer, Jas. Smith, Geo. Taylor, James Wilson, Geo. Ross.

RHODE ISLAND: Stephen Hopkins, William Ellery.

SOUTH CAROLINA: Edward Rutledge, Thos. Heyward, Jr., Thos. Lynch, Jr., Arthur Middleton.

VIRGINIA: George Wythe, Richard Henry Lee, Thomas Jefferson, Benjamin Harrison, Thos. Nelson, Jr., Francis Lightfoot Lee, Carter Braxton.

United States, DEPARTMENTS OF, the executive departments of the Union, whose chief officers comprise the cabinet of the President.

Executive departments were established before the adoption of the Constitution, but did not constitute an advisory board holding the dignity of the present cabinet. A Postmaster General was provided in 1775, and ministers of finance, war, and foreign affairs were appointed in 1781. Three of the executive departments—State, War, and Treasury—were established by Act of Congress in 1789, and the others later. Technological advances and the growing political and economic interdependence of nations have increased and complicated the activities of the executive departments in recent years, but their functions remain essentially the same as in the past. The head of each department is appointed by the President, subject to confirmation by the Senate, and receives an annual salary of \$25,000. Besides supervising the important work of his department, each cabinet officer may be required to give his opinion in writing to the President on any subject relating to the duties of his office. All the

departments have headquarters in Washington, D.C.

DEPARTMENT OF STATE. The department, established in 1789, originally had many domestic as well as foreign duties; today its activities are primarily concerned with U.S. relations with other nations, although it still has custody of the Great Seal of the U.S. The department is headed by the Secretary of State, the highest-ranking member of the cabinet. He is chief adviser to the President in the determination and execution of U.S. foreign policy and is responsible for the activities of the department, which include day-to-day international negotiations, promotion of solidarity with friendly nations, policies and programs for U.S. participation in international organizations, and correspondence with U.S. diplomats and consular representatives as well as with representatives of foreign nations. The Secretary is assisted by an Under Secretary, a Deputy Under Secretary, a Deputy Under Secretary for Administration, a Policy Planning Staff, and a Special Assistant for Mutual Security Affairs. The Deputy Under Secretary for Administration is assisted by a Controller and by an Administrator of the Bureau of Security and Consular Affairs, which includes the passport and visa offices, and he is responsible for the management and organization of the Foreign Service. The Foreign Service, headed by a Director General, maintains 69 embassies, 8 legations, and about 190 consulates or consular agencies throughout the world. The department also has bureaus for Inter-American; European; Far Eastern; Near Eastern, South Asian, and African; International Organization; Economic; and Public Affairs and for Congressional Relations, each of which is headed by an assistant secretary. Thomas Jefferson served as the first Secretary of State (1789-94).

THE TREASURY DEPARTMENT. The Treasury Dept., headed by the Secretary of the Treasury, was established in 1789. It controls the fiscal affairs of the government and has direct supervision of the national banks, the customs and internal-revenue systems, and the currency and coinage. Hence, it has under its jurisdiction the bureaus of Customs and of Engraving and Printing, and the Mint and the Internal Revenue Service. In addition, it has jurisdiction over the Coast Guard, the Bureau of Narcotics, and the Secret Service. Departmental subdivisions created in recent years include the U.S. Savings Bond Division (1945), successor to the War Finance Division, and the Office of Production and Defense Lending, established in 1954 to administer the programs of the liquidated Reconstruction Finance Corp. Alexander Hamilton was the first Secretary of the Treasury (1789-95).

DEPARTMENT OF JUSTICE. The Office of the Attorney General was created in 1789, but the Dept. of Justice, with the Attorney General as its director, was not established until 1870. The department provides the means of enforcing Federal laws, conducts suits in the Supreme Court in which the U.S. is concerned, supervises Federal penal institutions, and investigates violations of Federal statutes. The Attorney General directs the U.S. attorneys and marshals in the 94 judicial districts of the U.S., Alaska, Canal Zone, Guam, Hawaii, Puerto Rico, and the Virgin Islands. As the chief law officer of the Federal government, he gives advice to the President and the heads of other executive departments when requested. He is assisted by a Deputy Attorney General and a Solicitor General. A different Assistant Attorney General heads each of the following divisions: Antitrust, Civil, Criminal, Internal Security, Lands, and Tax. Other major

branches of the department are the Federal Bureau of Investigation (F.B.I.), the Bureau of Prisons, and the Immigration and Naturalization Service. The department also conducts a Board of Parole and a Board of Immigration Appeals. Amos T. Ackerman, Attorney General in 1870-71, was the first to head the department when it was established in 1870.

POST OFFICE DEPARTMENT. Postal service was established before the adoption of the Constitution, but the Post Office Dept. was not created until 1792 and did not become an executive department until 1872. The Postmaster General, designated as a member of the cabinet in 1829, directs the department, which has grown until it now has over 500,000 employees. There are five Assistant Postmasters General, each heading a bureau; a Deputy Postmaster General; an Executive Assistant; a Solicitor; a Chief Inspector; and other executives. The bureaus of the assistants direct the management of post offices; the appointment of postmasters; the transportation, routing, and distribution of the mails, including air mail; the Postal Savings system; the manufacture of postage stamps and stamped cards and envelopes; and the managing and equipping of buildings. Benjamin Franklin, who was appointed in 1775 as the first Postmaster General under the Continental Congress, laid the foundation for the present system. Samuel Osgood was the first to hold the position under the Constitution, serving from 1789 to 1791, and William T. Barry, Postmaster General from 1829 to 1835, was the first to be a member of the cabinet.

DEPARTMENT OF THE INTERIOR. The Dept. of the Interior, created in 1849 as the "Home Department," operates under direction of the Secretary of the Interior to conserve the nation's natural resources and promote the domestic welfare. The department conducts the Bureau of Reclamation, which reclaims unused land and builds dams, such as the Missouri River Basin project; the Bureau of Mines, which supervises mine safety projects, experiments in the production of synthetic liquid fuels, and controls important helium-producing plants; the Geological Survey; the Bureau of Indian Affairs; National Park Service; Fish and Wildlife Service; Bureau of Land Management; and Office of Territories. Special power projects of the department include the Bonneville Power Admin., with headquarters at Portland, Ore.; the Southeastern Power Admin., at Elberton, Ga.; and the Southwestern Power Admin., at Tulsa, Okla. Thomas Ewing served as the first Secretary of the Interior, from 1849 to 1850.

DEPARTMENT OF AGRICULTURE. The Dept. of Agriculture was created in 1862, and became an executive department in 1889, with the Secretary of Agriculture as the director. Organized to compile and disseminate useful information on agriculture, the department conducts research in all phases of agriculture, including agricultural industry, entomology, soils, marketing, home economics, nutrition, forestry, conservation, and crop, livestock, and dairy production, and makes its research results available for farm application. It also administers more than 50 laws to protect the farmer and the consumer and provides commodity standards and meat-inspection service. It aids in flood-control and in soil, water, and forest conservation measures and makes loans to farmers and farmer cooperatives. It also cooperates with the states in the national school-lunch program. The agencies of the department include the Agricultural Conservation Program Service, Agricultural Research Service, Farmer Cooperative Service, Federal Extension Service,

Forest Service, and Soil Conservation Service, all under the supervision of an Assistant Secretary for Federal-States Relations; the Agricultural Marketing Service, Commodity Exchange Authority, and Foreign Agricultural Service, under an Assistant Secretary for Marketing and Foreign Agriculture; the Commodity Credit Corp., Commodity Stabilization Service, and Federal Crop Insurance Corp., under an Assistant Secretary for Agricultural Stabilization; and the Farmers Home Admin., and Rural Electrification Admin., under a Director of Agricultural Credit Services. Norman J. Coleman headed the department when it first became an executive department in 1889.

DEPARTMENT OF COMMERCE. Originally created in 1903 as the Dept. of Commerce and Labor, it became the Dept. of Commerce in 1913, with the Secretary of Commerce as the director. He is assisted by an Under Secretary, who supervises the activities of the Coast and Geodetic Survey, National Bureau of Standards, and Patent Office; an Under Secretary for Transportation, who supervises the Civil Aeronautics Admin., Defense Air Transportation Admin., Maritime Admin., Federal Maritime Board, Bureau of Public Roads, and Weather Bureau; an Assistant Secretary for Domestic Affairs, who has jurisdiction over the Business and Defense Services Admin., Office of Business Economics, and Bureau of the Census; an Assistant Secretary for International Affairs, whose offices include the Bureau of Foreign Commerce, Foreign Trade Zones Board, and Office of International Trade Fairs; and an Assistant Secretary for Administration. The department has charge of fostering and developing the country's foreign and domestic commerce through publication of censuses, commercial statistics, and nautical and aeronautical charts; coastal and geodetic surveys; aids to air navigation, including inspection and registration of aircraft; promotion of inland waterway transportation; administration of Federal funds for highways; maintenance of the merchant marine; and establishment of commodity weights, measures, and standards, issuance of patents, and registration of trade-marks. William C. Redfield, serving from 1913 to 1919, was the first Secretary of Commerce.

DEPARTMENT OF LABOR. First a bureau in the Dept. of the Interior (1884), and later in the Dept. of Commerce and Labor (1903), the present Dept. of Labor was made a separate executive department, under the Secretary of Labor, in 1913. Its function is primarily to administer and enforce laws designed to foster the welfare of wage earners and to improve their working conditions and opportunities for employment. It operates the Bureau of Labor Statistics, Bureau of Labor Standards, Employees' Compensation Appeals Board, Bureau of Apprenticeship, Bureau of Employees' Compensation, Bureau of Veterans' Reemployment Rights, Women's Bureau, and Bureau of Employment Security, which includes the U.S. Employment Service. The first Secretary of Labor was William B. Wilson, who served from 1913 to 1921.

DEPARTMENT OF DEFENSE. The department was first established in 1947 as the National Military Establishment and was made an executive department of the government in 1949, with the Secretary of Defense taking the place of the former secretaries of the army, navy, and air force, all of whom retain the title of secretary but do not hold cabinet rank. The department, which includes the three military departments—Army, Navy, and Air Force—is responsible for the coordination and unified direction of the armed forces and of the departments, agencies, and functions of

the government which relate to the national security. The Secretary is assisted by a Deputy Secretary, an Armed Forces Policy Council, the Joint Chiefs of Staff, and Assistant Secretaries and other officials. James V. Forrestal was appointed the first Secretary of Defense (1947-49.)

The three components of the Dept. of Defense are as follows:

DEPARTMENT OF THE ARMY. Established in 1789 as the Dept. of War, it became the Dept. of the Army in 1947. It is responsible for organizing, training, and equipping U.S. land forces to provide support for national and international policy and for U.S. security. Its responsibilities also include control of Army appropriations and expenditures; development of improved weapons and matériel; defense of coastal cities and harbors of the U.S.; operation and protection of the Panama Canal; and supervision of the U.S. Military Acad. at West Point, N.Y. The Secretary of the Army is assisted by an Under Secretary and four Assistant Secretaries as well as by the Chief of Staff and other officials. The General Staff is charged with coordinating Army operations to develop the maximum of military efficiency, while the Special Staff has jurisdiction over the National Guard Bureau, the Army Reserve and R.O.T.C. Affairs, the Judge Advocate General, and other special divisions. The President has direct authority over this department, as Commander in Chief of the Army and Navy. Henry Knox was the first Secretary of War (1789-95). Kenneth C. Royall, serving from 1947 to 1949, was the first Secretary of the Army.

DEPARTMENT OF THE NAVY. The department, headed by the Secretary of the Navy, was established in 1798, naval affairs previously having been under War Dept. jurisdiction. The department has three principal divisions: (1) the Operating Forces of the Navy, comprising the fleets; the seagoing, sea frontier, district, Fleet Marine, and other assigned Marine forces; the Military Sea Transportation Service; and other forces and activities; (2) the bureaus, boards, and offices of the Navy Dept. and the headquarters of the U.S. Marine Corps and the U.S. Coast Guard (in wartime); and (3) the Shore Establishment, comprising all other activities of the Navy Dept. Assisting the Secretary of the Navy is an Under Secretary, four Assistant Secretaries, the Chief of Naval Operations, the Commandant of the Marine Corps, and other officials. Benjamin Stoddert was the first Secretary of the Navy, from 1798 to 1801.

DEPARTMENT OF THE AIR FORCE. It was created as a department from the Army Air Forces in 1947. Intended to include all military aviation forces, both combat and service, not otherwise assigned, the Air Force is organized, trained, and equipped primarily for prompt and sustained air offensive and defensive operations. It includes the Air Force Reserve and the Air National Guard. The Secretary of the Air Force, like the Secretaries of the Army and the Navy, is responsible to the Secretary of Defense and to the President as Commander in Chief of the armed forces. He is assisted by an Under Secretary and four Assistant Secretaries and by a Chief of Staff and other staff officers. The first Secretary of the Air Force was W. Stuart Symington (1947-50).

DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE. This department was formed in 1953 from the former Federal Security Agency, including such divisions as the Public Health Service, the Office of Education, the Social Security Admin., Office of Vocational

Rehabilitation, and Food and Drug Admin. The purpose of the department is to promote the general welfare in the fields of health, education, and social security. The first Secretary of Health, Education, and Welfare was Mrs. Oveta Culp Hobby (1953-55).

See also separate articles on individual agencies and offices of the Federal government.

United States Military Academy. See *Military Schools; West Point.*

United States Naval Academy. See *Naval Academy, U.S.*

Universalism (*û-nî-vêr'sâl-iz'm*), a liberal Christian denomination founded by John Murray in America in 1770. Originally, the central doctrine of this faith, based by Murray on the universal love of a just God for all mankind, was that eventually all men would be redeemed from their sins and imperfections. Murray's tenet was directed against the fatalistic Calvinism of his time; his conviction was that a just and omnipotent God would never condemn to endless torture finite and imperfect man. The theologian of early Universalism in America was Hosea Ballou, who in 1805 published "Treatise on the Atonement."

Universal Language (*û-nî-vêr'sal lăng'gwîj*). See *Esperanto; Volapük.*

Universal Military Training (*mîl'î-têr'î trăn'ing*), abbreviated U.M.T., a proposed program for U.S. military training, in which all able-bodied youth would be subject to six months of military instruction at the age of 18. During this period the youth would receive \$30.00 a month pay. No youth in the U.M.T. program would be sent overseas, but the Navy would be permitted to train its personnel on the seas. After the six-month training period, the trainee could return to civilian life, unless a national emergency demanded a prolonged service period. The trainee would continue to be in the active reserves for a period of seven and one-half years after the completion of his training.

In 1947 a special Presidential Advisory Committee recommended the passage of a U.M.T. program, but the measure found only moderate support in Congress. However, the draft bill, called the Universal Military Training and Service Act, passed by Congress on July 9, 1951, during the Korean war, was considered by many to be a first step toward U.M.T.

Reactions to the proposed U.M.T. program have varied widely. Advocates of U.M.T. emphasize the fact that trainees would return to civilian life in six months, and point out the necessity of having well-trained youth and a large reserve of military manpower. Those opposed to U.M.T. hold that six months is insufficient training, that the program would be expensive and inadequate, that U.M.T. is militaristic, and that it would not provide an immediate source of trained manpower. See also *Draft*.

Universe (*ū'nī-vērs*), the total aggregate of created things, or all the created things viewed as constituting one system. Anciently the earth was supposed to be the center of the universe and all the heavenly bodies were believed to revolve about it. The invention of the telescope and the discovery of the law of gravitation revolutionized this theory to the extent that the sun was made the center of the universe, but it was still supposed that all the planets and the countless stars moved about the sun as a center. Ultimately it became known that space includes many solar systems and that the sun is but the center of one system within the universe. Modern astronomy makes the universe one grand whole, so widely extensive, so entirely endless in space, that the mind is incapable of conceiving any limits or fixing boundaries beyond which its influence does not extend. In this sense the universe includes not only the planets and all the satellites known to us, but embraces every particle of creation. It comprises not only our solar system, but includes the numerous other similar systems of which many of the fixed stars seem to be the centers. See *Solar System*.

Universities and Colleges (*ū'nī-vēr' sī-tēz*, *kōl' lēj-ēz*). The word "university" originally meant any corporation or community. About the 14th century the Latin word *universitas* began to be used by itself with the exclusive meaning of a recognized community of scholars. In modern usage, a university is a group of colleges on common land, including schools for post-graduate and advanced professional research. Strictly speaking, a college cannot call itself a university unless it embraces both graduate and undergraduate schools. Most commonly, these graduate schools are those of medicine, theology, law, and philosophy.

The first American institution of higher learning was Harvard Coll., founded by a grant of public money from the General Court of Massachusetts in 1636. In 1862 Congress passed the Morrill Act, the greatest single stimulus to higher education in American history. The act granted to each state 30,000 acres of public land for each member of Congress a state elected, provided the state would use the land (or the rents thereof) for the establishment of colleges of agriculture and mechanic arts. In 18 states the appropriation was added to the already existing tax-supported state universities. Massachusetts, New York, and New Jersey turned the property over to privately endowed institutions, and the remaining states founded new educational bodies.

Originally few women sought education beyond the secondary school, but by 1837 the demand for such instruction had grown sufficiently to open the first college restricted to female students, Mt. Holyoke Seminary. Elmira, Vassar, Wells, Welles-

ley, Smith, Hunter, and Bryn Mawr colleges followed, the last named being established in 1880.

By 1900, 249 colleges and universities existed in the U.S. The standard requirements for entrance were a high-school diploma, or the passing of an examination which would certify the equivalent of such study. Some colleges, being petitioned for more admissions than they had facilities for, instituted the practice of accepting those students with the highest averages in their preparatory work. At first, three-year courses were customary, but these were soon lengthened to four years. These years are generally known as the freshman, sophomore, junior, and senior. A type of college course which is becoming increasingly common requires the student to devote his freshman and sophomore years to three broad general fields of study: the humanities, the social sciences, and the natural or physical sciences. In his junior and senior years he is allowed to elect more specialized courses, according to his individual interests. The study of at least one modern foreign language is usually required, and some form of physical training is compulsory for part of the student's undergraduate career. The B.A. or A.B. (Bachelor of Arts) degree is conferred upon the student who completes this course, and the B.S. (Bachelor of Science) degree is awarded for completion of a predominantly scientific course.

The opening of Johns Hopkins Univ. (1876) was the first successful attempt to establish a graduate school in America, entrance to which could only be obtained by the possessor of a college education. In such universities the degrees of A.M. or M.A. (Master of Arts), and Ph.D. (Doctor of Philosophy) are given. Besides carrying on an original investigation in his particular field of study, the candidate for the degree of Ph.D. must have a reading knowledge of French and German (often of Latin as well), attend a required number of classroom courses or seminars, pass a comprehensive oral examination, and submit a dissertation which embodies the results of his research. The M.A. degree is conferred upon students who pass certain prescribed examinations after one year of graduate study. In 1871-72 there were only 198 graduate students, while "Statistics of Higher Education, 1947-48," reports 174,432 graduate students in that period.

About the turn of the century there arose a controversy between the advocates of liberal education and those educators who believed that all studies should be geared to the immediate needs of a future wage-earner. The adherents of liberal education believe that a college graduate who is familiar with the greatest achievements in literature, art, music, philosophy, and the like is capable of greater individual development and thus will more materially raise the cultural and intel-

lectual level of the nation. The technical educators argue that all knowledge not used in everyday work will necessarily be forgotten, that the demands for vocational training are constantly increasing, and that the need for keeping abreast of a technical specialty will require all available time. At a time when American industry was rapidly expanding, the demand increased for trained personnel—engineers, chemists, physicists, etc. Gradually the college curriculum yielded to this pressure, and greater stress was put on technical education. In recent years many educators have come to the conclusion that specialization has lowered the general level of American mentality, and that only by a return to "knowledge for knowledge's sake" can the damage be repaired. Beginning in the 1920's and 1930's, this belief found expression in the widespread adoption of compulsory courses in the humanities and the social sciences. Such institutions as Columbia Univ., the Univ. of Chicago, and St. John's Coll. (q.v.) were among the first to inaugurate this type of course. In 1945 the movement to stress the humanities in the colleges was stimulated by the release of a report, entitled "General Education in a Free Society," prepared by the Harvard Univ. Committee of Twelve. This report recommended a basic college curriculum of six courses concerned with the humanities, the social sciences, and the natural or physical sciences. The committee further proposed a course in "American Democracy" and another in "Human Relations." See also *Liberal Arts Education*.

One of the most significant events of the 20th century in American education, and one which was heralded throughout the free world as a victory of the democratic process, was the unanimous decision of the Supreme Court, announced on May 17, 1954, which declared racial segregation in public schools unconstitutional. This decision, reversing the "separate-but-equal" ruling of the Supreme Court in 1896, held that separate educational facilities are inherently unequal. It affected 17 states having mandatory public-school segregation and four states having permissive segregation. Although the decision was concerned primarily with education on the primary and secondary levels, there could be no doubt of its immediate and far-reaching effects on institutions of higher learning. Even before the ruling was announced, Negro students were being admitted for the first time to many Southern colleges and universities which had previously excluded them.

College enrollments in the years following the end of World War II rose to record heights. The annual report of the U.S. Office of Education announced a total college enrollment of 2,250,701 for the year 1953-54. This figure represented an increase of 4.8 per cent over the previous year's enrollment and a rise of almost 50 per cent over

that of 1939, the last prewar year. The heavy load of students was caused by the influx of veterans from World War II and the Korean War, taking advantage of the educational benefits granted to them by the Federal government, under the so-called GI Bills.

Rising prices and the devaluation of endowments confronted many private institutions of higher learning with serious financial problems. Those colleges and universities which participated in the programs of veterans' education received substantial additions to their income, but in many cases these additions did not cover the full cost of the programs. In some instances greatly increased enrollments created problems of student housing and overexpansion of the physical plant. Endowed institutions faced a fundamental financial crisis chiefly because future endowments did not seem likely to equal in monetary value those of the past.

See also lists of colleges and universities beginning on the following page, with faculty and enrollment figures for the most recent school year, and individual articles on various colleges and universities; *Education*; *Schools*.

Foreign Universities. Unlike most modern American universities, European universities today still preserve many of the old traditions in the discipline of learning. Developing originally from monastic schools (e.g., Pavia, Oxford, Paris, Bologna, Padua, etc.) where only the liberal arts were taught, they only gradually added faculties of law, medicine, the natural sciences, and other fields of human knowledge. The principal difference between European and American universities is one of over-all educational levels. The European university customarily includes education on a level roughly equivalent to the last two years of college training in the U.S. and goes on to cover what is usually considered graduate work in the U.S. Continental universities do not grant baccalaureate degrees. The student in Europe has almost unlimited freedom in selecting his curriculum because he is not bound to take courses for credit. Campus life as it is known in the U.S. does not exist in Europe, except in England, where some of the universities are subdivided into colleges which maintain living quarters for the students. The oldest university in Europe was that of Salerno, Italy, which was founded as a medical school in the 9th century.

Unknownns (ŭn-nōnz'), TOMB OF THE, a memorial tomb in Arlington National Cemetery, Virginia, where lie the bodies of unidentified soldiers of World Wars I and II and the Korean conflict. It was dedicated in 1920 as the Tomb of the Unknown Soldier. At that time an unidentified soldier who fell in France in World War I, holder of the first Congressional Medal of Honor, was

UNIVERSITIES AND COLLEGES

| Name | Date Founded | Location | No. on Faculty | No. of Students | Name | Date Founded | Location | No. on Faculty | No. of Students |
|--|--------------|---------------------------|------------------|-----------------|---------------------------------|--------------|-------------------------|----------------|-----------------|
| Adelphi Coll. | 1896 | Garden City, N.Y. | 377 | 5,697 | Colby Coll. | 1813 | Waterville, Maine | 114 | 1,168 |
| Air Force Academy, U.S. | 1955 | Colorado | 372 | 1,584 | Colgate Univ. | 1819 | Hamilton, N.Y. | 117 | 1,397 |
| Akron, Univ. of | 1871 | Akron, Ohio | 254 | 5,181 | Colorado Coll. | 1874 | Colorado Springs, Colo. | 106 | 1,275 |
| Alabama Polytechnic Inst. | 1872 | Auburn, Ala. | 654 | 8,546 | Colorado State Univ. | 1879 | Ft. Collins, Colo. | 420 | 5,977 |
| Alabama, Univ. of | 1831 | University, Ala. | 1,000 | 13,691 | Colorado, Univ. of | 1876 | Boulder, Colo. | 785 | 16,162 |
| American Univ. | 1893 | Washington, D.C. | 459 | 7,961 | Columbia Univ. ² | 1754 | New York, N.Y. | 2,521 | 25,523 |
| Amherst Coll. | 1821 | Amherst, Mass. | 134 | 996 | Connecticut Coll. | 1911 | New London, Conn. | 120 | 1,066 |
| Antioch Coll. | 1853 | Yellow Springs, Ohio | 97 | 1,302 | Cooper Union | 1881 | Storrs, Conn. | 1,000 | 10,756 |
| Arizona, Univ. of | 1885 | Tucson, Ariz. | 816 | 12,548 | Corcoran Univ. | 1859 | New York, N.Y. | 117 | 1,315 |
| Arkansas, Univ. of | 1871 | Fayetteville, Ark. | 541 | 5,461 | Cornell Univ. | 1865 | Ithaca, N.Y. | 1,722 | 11,543 |
| Ark Coll. | 1860 | Annandale-on-Hudson, N.Y. | 48 | 295 | Dartmouth Coll. | 1769 | Hanover, N.H. | 249 | 3,137 |
| Barnard Coll. | 1889 | New York, N.Y. | 171 ¹ | 1,439 | Delaware, Univ. of | 1831 | Newark, Del. | 275 | 5,230 |
| Bates Coll. | 1864 | Lewiston, Maine | 54 | 804 | Denison Univ. | 1831 | Granville, Ohio | 121 | 1,451 |
| Baylor Univ. | 1845 | Waco, Texas | 397 | 5,046 | Denver, Univ. of | 1864 | Denver, Colo. | 313 | 5,796 |
| Beaver Coll. | 1853 | Jenkintown, Pa. | 62 | 654 | De Paul Univ. | 1898 | Chicago, Ill. | 368 | 8,516 |
| Beloit Coll. | 1846 | Beloit, Wis. | 88 | 1,028 | DePauw Univ. | 1837 | Greencastle, Ind. | 173 | 2,166 |
| Bennington Coll. | 1932 | Bennington, Vt. | 53 | 364 | Detroit, Univ. of | 1877 | Detroit, Mich. | 629 | 10,869 |
| Berea Coll. | 1855 | Berea, Ky. | 112 | 1,235 | Drake Univ. | 1881 | Des Moines, Iowa | 242 | 7,022 |
| Birmingham-Southern Coll. | 1856 | Birmingham, Ala. | 68 | 1,081 | Drexel Inst. of Technology | 1891 | Philadelphia, Pa. | 527 | 5,454 |
| Boston Coll. | 1863 | Chestnut Hill, Mass. | 566 | 7,646 | Duke Univ. | 1838 | Durham, N.C. | 716 | 5,747 |
| Boston Univ. | 1893 | Boston, Mass. | 1,650 | 24,830 | Duquesne Univ. | 1878 | Pittsburgh, Pa. | 256 | 5,340 |
| Bowdoin Coll. | 1794 | Brunswick, Maine | 71 | 811 | Emory Univ. | 1836 | Emory University, Ga. | 1,030 | 4,764 |
| Bowling Green State Univ. | 1910 | Bowling Green, Ohio | 298 | 6,614 | Fisk Univ. | 1865 | Nashville, Tenn. | 63 | 763 |
| Brandeis Univ. | 1947 | Waltham, Mass. | 271 | 1,466 | Florida State Univ. | 1857 | Tallahassee, Fla. | 605 | 10,946 |
| Bright Young Univ. | 1875 | Provo, Utah | 776 | 10,888 | Florida, Univ. of | 1853 | Gainesville, Fla. | 901 | 13,087 |
| Brooklyn Coll. | 1939 | Brooklyn, N.Y. | 1,182 | 19,813 | Fordham Univ. | 1841 | New York, N.Y. | 653 | 8,855 |
| Bryn Mawr Coll. (incl. Pembroke Coll.) | 1764 | Providence, R.I. | 613 | 4,012 | Franklin and Marshall Coll. | 1787 | Lancaster, Pa. | 102 | 1,748 |
| Bryn Mawr Coll. | 1885 | Bryn Mawr, Pa. | 166 | 962 | Georgetown Univ. | 1789 | Washington, D.C. | 1,397 | 6,017 |
| Bucknell Univ. | 1846 | Lewisburg, Pa. | 182 | 2,472 | George Washington Univ. | 1821 | Washington, D.C. | 1,104 | 10,011 |
| Buffalo, Univ. of | 1846 | Buffalo, N.Y. | 1,413 | 11,047 | Georgia Inst. of Technology | 1885 | Atlanta, Ga. | 464 | 6,526 |
| Butler Univ. | 1850 | Indianapolis, Ind. | 259 | 3,790 | Georgia State Coll. for Women | 1889 | Milledgeville, Ga. | 53 | 706 |
| California, Univ. of | 1891 | Pasadena, Calif. | 459 | 1,288 | Georgia, Univ. of | 1785 | Athens, Ga. | 500 | 8,328 |
| California Inst. of Technology | 1868 | Berkeley, Calif. | 5,741 | 44,877 | Goucher Coll. | 1885 | Baltimore, Md. | 76 | 771 |
| Carnegie Inst. of Technology | 1900 | Pittsburgh, Pa. | 342 | 5,144 | Grinnell Coll. | 1846 | Grinnell, Iowa | 92 | 1,016 |
| Catholic Univ. of America | 1862 | Cleveland, Ohio | 417 | 2,313 | Gustavus Adolphus Coll. | 1862 | St. Peter, Minn. | 94 | 1,170 |
| Chattanooga, Univ. of | 1886 | Washington, D.C. | 575 | 4,159 | Hamilton Coll. | 1812 | Clinton, N.Y. | 76 | 709 |
| Chicago, Univ. of | 1890 | Chicago, Ill. | 1,068 | 8,728 | Hamline Univ. | 1854 | St. Paul, Minn. | 107 | 1,048 |
| Cincinnati, Univ. of | 1810 | Cincinnati, Ohio | 1,350 | 16,823 | Hampton Inst. | 1776 | Hamden-Sydney, Va. | 29 | 416 |
| Citadel, The | 1842 | Charleston, S.C. | 132 | 2,042 | Harvard Univ. ³ | 1636 | Cambridge, Mass. | 120 | 1,243 |
| City Coll., The | 1847 | New York, N.Y. | 1,551 | 29,296 | Haverford Coll. | 1833 | Haverford, Pa. | 4,100 | 13,038 |
| Clark Univ. | 1887 | Worcester, Mass. | 121 | 1,650 | Hobart and William Smith Colls. | 1822 | Geneva, N.Y. | 86 | 1,074 |
| Clarkson Agricultural Coll. | 1889 | Clemson College, S.C. | 333 | 3,889 | Holstra Coll. | 1935 | Hempstead, N.Y. | 385 | 8,574 |
| | | | | | Holy Cross, Coll. of the | 1843 | Worcester, Mass. | 138 | 1,827 |

¹ Totals also included with Columbia Univ.

² Includes Barnard Coll.

³ Includes Radcliffe Coll.

UNIVERSITIES AND COLLEGES (Continued)

| Name | Date Founded | Location | No. on Faculty | No. of Students | Name | Date Founded | Location | No. on Faculty | No. of Students |
|---|--------------|---------------------|----------------|-----------------|---|--------------|-----------------------|--------------------|-----------------|
| Houston, Univ. of | 1934 | Houston, Texas | 545 | 11,592 | Michigan State Univ. | 1855 | East Lansing, Mich. | 1,452 ^a | 21,860 |
| Howard Coll. | 1842 | Birmingham, Ala. | 103 | 2,110 | Michigan, Univ. of | 1817 | Ann Arbor, Mich. | 1,727 | 28,117 |
| Hunter Coll. | 1867 | Washington, D.C. | 582 | 4,876 | Middlebury Coll. | 1800 | Middlebury, Vt. | 105 | 1,286 |
| Idaho, Univ. of | 1870 | New York, N.Y. | 846 | 15,468 | Military Academy, U.S. | 1802 | West Point, N.Y. | 415 | 2,466 |
| Illinois Inst. of Technology | 1889 | Moscow, Idaho | 347 | 3,013 | Mills Coll. | 1882 | Oakland, Calif. | 76 | 723 |
| Illinois State Normal Univ. | 1892 | Chicago, Ill. | 497 | 7,316 | Minnesota, Univ. of (including Duluth Branch) | 1851 | Minneapolis, Minn. | 3,028 | 35,882 |
| Illinois State Normal Univ. | 1897 | Normal, Ill. | 230 | 4,433 | Mississippi State Univ. | 1878 | State College, Miss. | 301 | 4,676 |
| Indiana Univ. | 1867 | Urbana, Ill. | 4,605* | 28,772 | Mississippi State Coll. for Women | 1884 | Columbus, Miss. | 98 | 1,379 |
| Iowa State Univ. of Science and Technology | 1880 | Bloomington, Ind. | 2,500* | 24,649 | Missouri, Univ. of | 1848 | Oxford, Miss. | 430 | 4,673 |
| Iowa State Univ. of Science and Technology | 1858 | Ames, Iowa | 734 | 9,353 | Missouri, Univ. of | 1839 | Columbia, Mo. | 1,499 | 14,166 |
| Iowa Wesleyan Coll. | 1847 | Iowa City, Iowa | 1,695 | 10,789 | Montana State Coll. | 1893 | Bozeman, Mont. | 330 | 3,863 |
| Iowa Wesleyan Coll. | 1842 | Mt. Pleasant, Iowa | 40 | 677 | Montana State Univ. | 1893 | Bozeman, Mont. | 350 | 3,603 |
| Johns Hopkins Univ. | 1876 | Baltimore, Md. | 1,511* | 7,946 | Mt. Holyoke Coll. | 1837 | South Hadley, Mass. | 188 | 1,443 |
| Kansas State Univ. of Agriculture and Applied Science | 1863 | Manhattan, Kans. | 669 | 8,036 | Mundelein Coll. | 1830 | Chicago, Ill. | 85 | 1,684 |
| Kansas, Univ. of | 1865 | Lawrence, Kans. | 900 | 9,435 | Naval Academy, U.S. | 1845 | Annapolis, Md. | 524 | 3,730 |
| Kentucky, Univ. of | 1865 | Lexington, Ky. | 721 | 9,793 | Nebraska, Univ. of | 1869 | Lincoln, Nebr. | 811 | 8,746 |
| Kenyon Coll. | 1824 | Gambier, Ohio | 64 | 569 | Nebraska Wesleyan Univ. | 1887 | Lincoln, Nebr. | 66 | 1,052 |
| Knoxville Coll. | 1875 | Knoxville, Tenn. | 44 | 613 | Nevada, Univ. of | 1874 | Reno, Nev. | 238 | 3,708 |
| Lafayette Coll. | 1826 | Easton, Pa. | 165 | 1,795 | New Hampshire, Univ. of | 1866 | Durham, N.H. | 343 | 4,008 |
| Lake Forest Coll. | 1857 | Lake Forest, Ill. | 68 | 1,153 | New Mexico State Univ. of Agriculture, Engineering, and Science | 1889 | University Park, N.M. | 163 | 3,866 |
| LaSalle Coll. | 1863 | Philadelphia, Pa. | 210 | 4,159 | New Mexico, Univ. of | 1889 | Albuquerque, N.M. | 426 | 7,277 |
| Lehigh Univ. | 1865 | Bethlehem, Pa. | 364 | 3,520 | New York Univ. | 1831 | New York, N.Y. | 4,271 | 41,180 |
| Lincoln Univ. | 1866 | Jefferson City, Mo. | 101 | 1,428 | North Carolina, Univ. of | 1789 | Chapel Hill, N.C. | 979 | 8,169 |
| Long Island Univ. | 1906 | Brooklyn, N.Y. | 330 | 4,918 | Woman's Coll. | 1891 | Greensboro, N.C. | 211 | 2,609 |
| Louisiana Coll. | 1906 | Pineville, La. | 57 | 1,006 | North Carolina State Coll. of Agric. and Engineering | 1889 | Raleigh, N.C. | 601 | 7,624 |
| Louisiana Polytechnic Inst. | 1894 | Ruston, La. | 251 | 3,498 | North Dakota Agric. Coll. | 1889 | Fargo, N.D. | 261 | 3,350 |
| Louisiana State Univ. and Agric. and Mech. Coll. | 1860 | Baton Rouge, La. | 1,349 | 12,725 | North Dakota, Univ. of | 1883 | Grand Forks, N.D. | 321 | 3,887 |
| Louisville, Univ. of | 1798 | Louisville, Ky. | 960 | 6,389 | Northeastern Univ. | 1868 | Boston, Mass. | 820 | 17,138 |
| Loyola Univ. | 1870 | Chicago, Ill. | 947 | 9,564 | North Texas State Coll. | 1890 | Denton, Texas | 420 | 7,023 |
| Loyola Univ. | 1912 | New Orleans, La. | 218 | 2,573 | Northwestern Univ. | 1851 | Evanston, Ill. | 1,888 | 15,629 |
| Maine, Univ. of | 1865 | Orono, Maine | 379 | 5,449 | Notre Dame, Ind. | 1842 | Notre Dame, Ind. | 471 | 6,395 |
| Manhattan Coll. | 1853 | New York, N.Y. | 204 | 3,051 | Oberlin Coll. | 1833 | Oberlin, Ohio | 232 | 2,390 |
| Manhattanville Coll. of the Sacred Heart | 1841 | Purchase, N.Y. | 86 | 787 | Ohio State Univ. | 1873 | Columbus, Ohio | 2,967 | 23,260 |
| Marietta Coll. | 1835 | Marietta, Ohio | 65 | 1,453 | Ohio Wesleyan Univ. | 1864 | Athens, Ohio | 779 | 10,559 |
| Marquette Univ. | 1864 | Milwaukee, Wis. | 1,101 | 10,143 | Oklahoma State Univ. | 1842 | Delaware, Ohio | 167 | 2,040 |
| Maryland, Univ. of | 1867 | College Park, Md. | 1,947 | 15,730 | Oklahoma, Univ. of | 1891 | Stillwater, Okla. | 602 | 10,300 |
| Marymount Coll. | 1907 | Tarrytown, N.Y. | 68 | 646 | Omaha, Municipal Univ. of | 1890 | Norman, Okla. | 640 | 13,068 |
| Massachusetts Inst. of Technology | 1861 | Cambridge, Mass. | 1,130 | 6,270 | Oregon State Coll. | 1908 | Omaha, Nebr. | 181 | 5,753 |
| Massachusetts, Univ. of | 1863 | Amherst, Mass. | 514 | 5,731 | Oregon, Univ. of | 1868 | Corvallis, Ore. | 735 | 7,727 |
| Miami Univ. | 1869 | Oxford, Ohio | 411 | 10,075 | Pennsylvania State Univ. | 1872 | Eugene, Ore. | 700* | 6,717 |
| Michigan Coll. of Mining and Technol. | 1885 | Houghton, Mich. | 210 | 3,955 | | 1855 | University Park, Pa. | 1,714 | 20,377 |

* Approximate.

* Part of the campus is in Baltimore.

* Approximate.

* Fulltime equivalents.

UNIVERSITIES AND COLLEGES (Continued)

| Name | Date Founded | Location | No. on Faculty | No. of Students | Name | Date Founded | Location | No. on Faculty | No. of Students |
|---|--------------|---------------------|----------------|-----------------|--|--------------|----------------------|----------------|-----------------|
| Pennsylvania, Univ. of | 1740 | Philadelphia, Pa. | 3,124 | 17,839 | Texas Woman's Univ. | 1901 | Denton, Texas | 185 | 2,482 |
| Pittsburgh, Univ. of | 1787 | Pittsburgh, Pa. | 1,226 | 14,410 | Texas Technological Coll. | 1923 | Lubbock, Texas | 544 | 8,867 |
| Pomona Coll. | 1887 | Claremont, Calif. | 115 | 1,107 | Texas, Univ. of | 1881 | Austin, Texas | 1,941 | 23,687 |
| Pratt Inst. | 1887 | Brooklyn, N.Y. | 315 | 4,593 | Toledo, Univ. of | 1872 | Toledo, Ohio | 321 | 5,519 |
| Princeton Univ. | 1746 | Princeton, N.J. | 626 | 3,780 | Trinity Coll. | 1823 | Hartford, Conn. | 111 | 1,384 |
| Principia Coll., The | 1898 | Elsah, Ill. | 48 | 522 | Tufts Univ. | 1852 | Malden, Mass. | 498 | 4,255 |
| Purdue Univ. | 1869 | Lafayette, Ind. | 1,619 | 16,176 | Tulane Univ. (including Newcomb Coll.) | 1834 | New Orleans, La. | 1,372 | 6,625 |
| Queens Coll. | 1937 | Flushing, N.Y. | 525 | 10,105 | Union Coll. and Union Univ. | 1795 | Schenectady, N.Y. | 273 | 2,662 |
| Radcliffe Coll. | 1879 | Cambridge, Mass. | — | 1,062 | Utah State Univ. | 1888 | Logan, Utah | 302 | 4,969 |
| Randolph-Macon Woman's Coll. | 1891 | Lynchburg, Va. | 44 | 503 | Utah, Univ. of | 1850 | Salt Lake City, Utah | 900 | 10,677 |
| Redlands, Univ. of | 1907 | Redlands, Calif. | 101 | 1,482 | Vanderbilt Univ. | 1872 | Nashville, Tenn. | 683 | 3,733 |
| Reed Coll. | 1911 | Portland, Ore. | 77 | 804 | Vassar Coll. | 1861 | Poughkeepsie, N.Y. | 180 | 1,410 |
| Rensselaer Polytechnic Inst. | 1824 | Troy, N.Y. | 512 | 4,461 | Vermont, Univ. of | 1791 | Burlington, Vt. | 412 | 3,271 |
| Rhode Island, Univ. of | 1802 | Kingston, R.I. | 320 | 3,030 | Villanova Coll. | 1842 | Villanova, Pa. | 333 | 6,327 |
| Rice Inst. | 1912 | Houston, Texas | 171 | 1,989 | Vincennes Univ. | 1806 | Vincennes, Ind. | 30 | 524 |
| Richmond, Univ. of | 1832 | Richmond, Va. | 190 | 3,050 | Virginia Military Inst. | 1839 | Lexington, Va. | 96 | 1,077 |
| Rochester, Univ. of | 1850 | Rochester, N.Y. | 1,090 | 6,574 | Virginia Polytechnic Inst. | 1872 | Blacksburg, Va. | 402 | 4,911 |
| Russell Sage Coll. | 1916 | Troy, N.Y. | 169 | 2,314 | Virginia, Univ. of | 1819 | Charlottesville, Va. | 707 | 4,865 |
| Rutgers Univ. | 1766 | New Brunswick, N.J. | 1,891 | 16,250 | Wake Forest Coll. | 1834 | Winston-Salem, N.C. | 316 | 2,505 |
| St. John's Coll. | 1606 | Annapolis, Md. | 32 | 257 | Washington and Lee Univ. | 1749 | Lexington, Va. | 101 | 1,138 |
| St. John's Univ. | 1870 | Brooklyn, N.Y. | 343 | 9,617 | Washington State Univ. | 1889 | Pullman, Wash. | 600* | 6,918 |
| St. Lawrence Univ. | 1856 | Canton, N.Y. | 114 | 1,065 | Washington Univ. | 1853 | St. Louis, Mo. | 1,800* | 13,088 |
| St. Louis Univ. | 1818 | St. Louis, Mo. | 1,219 | 7,580 | Washington, Univ. of | 1861 | Seattle, Wash. | 1,424 | 22,032 |
| Sarah Lawrence Coll. | 1926 | Bronxville, N.Y. | 70 | 420 | Wayne State Univ. | 1868 | Detroit, Mich. | 1,430 | 20,510 |
| Scripps Coll. | 1926 | Claremont, Calif. | 39 | 258 | Wellesley Coll. | 1870 | Wellesley, Mass. | 179 | 1,702 |
| Simmons Coll. | 1899 | Boston, Mass. | 236 | 1,253 | Wesleyan Univ. | 1868 | Aurora, N.Y. | 50 | 413 |
| Smith Coll. | 1871 | Northampton, Mass. | 264 | 2,393 | West Virginia Univ. | 1831 | Middletown, Conn. | 150 | 878 |
| South, Univ. of the | 1857 | Sewanee, Tenn. | 51 | 601 | Western Reserve Univ. | 1867 | Morgantown, W. Va. | 598 | 7,051 |
| South Carolina, Univ. of | 1801 | Columbia, S.C. | 377 | 5,356 | Wheaton Coll. | 1826 | Cleveland, Ohio | 1,128 | 7,600 |
| South Dakota State Coll. of Agriculture and Mechanic Arts | 1881 | Brookings, S.D. | 348 | 3,412 | Wheaton, Ill. | 1860 | Wheaton, Ill. | 152 | 1,895 |
| South Dakota, Univ. of | 1882 | Vermillion, S.D. | 246 | 2,563 | Wichita, Univ. of | 1926 | Wichita, Kans. | 320 | 5,875 |
| Southern California, Univ. of | 1880 | Los Angeles, Calif. | 1,042 | 18,009 | Willamette Univ. | 1842 | Salem, Ore. | 95 | 1,134 |
| Southern Illinois Univ. | 1869 | Carbondale, Ill. | 855 | 11,994 | William and Mary, Coll. of | 1693 | Williamsburg, Va. | 153 | 3,128 |
| Southern Methodist Univ. | 1911 | Dallas, Texas | 364 | 7,680 | Williams Coll. | 1793 | Williamstown, Mass. | 146 | 1,183 |
| Stanford Univ. | 1885 | Stanford, Calif. | 1,896 | 8,760 | Winthrop Coll. | 1886 | Rock Hill, S.C. | 117 | 1,368 |
| Stetson Univ. | 1883 | De Land, Fla. | 125 | 1,780 | Wisconsin, Univ. of | 1848 | Madison, Wis. | 2,319 | 28,034 |
| Stevens Inst. of Technology | 1870 | Hoboken, N. J. | 192 | 2,058 | Wittenberg Coll. | 1845 | Springfield, Ohio | 168 | 3,198 |
| Swarthmore Coll. | 1864 | Swarthmore, Pa. | 124 | 930 | Worcester Polytechnic Inst. | 1865 | Worcester, Mass. | 143 | 1,125 |
| Sweet Briar Coll. | 1901 | Sweet Briar, Va. | 67 | 539 | Wyoming, Univ. of | 1887 | Laramie, Wyo. | 356 | 4,242 |
| Syracuse Univ. | 1870 | Syracuse, N.Y. | 1,190 | 17,466 | Xavier Univ. | 1831 | Cincinnati, Ohio | 210 | 4,224 |
| Temple Univ. | 1884 | Philadelphia, Pa. | 1,066 | 17,827 | Xavier Univ. | 1915 | New Orleans, La. | 84 | 970 |
| Tennessee, Univ. of | 1794 | Knoxville, Tenn. | 1,313 | 15,457 | Yale Univ. | 1701 | New Haven, Conn. | 2,066 | 7,795 |
| Texas Christian Univ. | 1873 | Ft. Worth, Texas | 169 | 6,264 | Yeshiva Univ. | 1884 | New York, N.Y. | 875 | 3,405 |
| Texas Southern Univ. | 1947 | Houston, Texas | 149 | 3,036 | Youngstown Univ. | 1908 | Youngstown, Ohio | 343 | 6,185 |

* Identical with Harvard Univ.

* Approximate.

FAMOUS FOREIGN UNIVERSITIES

| University | Founded | Country | No. on Faculty ¹ | No. of Students ¹ | University | Founded | Country | No. on Faculty ¹ | No. of Students ¹ |
|--------------|---------|-------------|-----------------------------|------------------------------|----------------|---------|-----------------------|-----------------------------|------------------------------|
| Alberta | 1908 | Canada | 308 | 4,865 | Lille | 1562 | France | 4 ² | 5,321 |
| al-Azhar | 970 | Egypt | 3 ² | 14,402 | Lima | 1551 | Peru | 883 | 7,927 |
| Basel | 1460 | Switzerland | 231 | 2,185 | Lisbon | 1890 | Portugal | 183 | 5 |
| Belgrade | 1863 | Yugoslavia | 382 | 25,036 | London | 1836 | England | 82 | 41,643 |
| Birmingham | 1900 | England | 280 | 3,217 | Louvain | 1426 | Belgium | 361 | 7,207 |
| Bologna | 1088 | Italy | 10 ² | 15,535 | Lund | 1666 | Sweden | 200 ⁴ | 2,602 |
| Bombay | 1857 | India | 1,742 | 49,666 | Madras | 1857 | India | 2,418 | 39,073 |
| Bordeaux | 1441 | France | 4 ² | 5,000 ⁴ | Manila | 1913 | Philippine Islands | 110 | 2,925 |
| Brussels | 1834 | Belgium | 5 ⁵ | 3,655 | Manitoba | 1877 | Canada | 235 | 4,984 |
| Budapest | 1635 | Hungary | 577 | 10,454 | Marburg | 1527 | Germany | 148 | 3,252 |
| Buenos Aires | 1821 | Argentina | 82 | 22,076 | McGill | 1821 | Canada | 1,078 | 12,537 |
| Caen | 1431 | France | 103 | 2,000 | Melbourne | 1853 | Australia | 397 | 7,283 |
| Calcutta | 1857 | India | 368 | 42,818 | Mexico | 1551 | Mexico | 3,719 | 21,844 |
| Cambridge | 1209 | England | 337 | 7,432 | Montevideo | 1840 | Uruguay | 294 | 7,199 |
| Coimbra | 1290 | Portugal | 53 | 2,000 | Montpellier | 1180 | France | 111 | 4,431 |
| Cologne | 1388 | Germany | 122 | 4,267 | Moscow | 1876 | Canada | 1,458 | 14,238 |
| Colombia | 1572 | Colombia | 190 | 6,500 | Nancy | 1755 | U.S.S.R. | 1,541 | 9,000 ⁴ |
| Copenhagen | 1479 | Denmark | 552 | 8,551 | Naples | 1572 | France | 251 | 4,392 |
| Cracow | 1364 | Poland | 135 | 996 | Oslo | 1224 | Italy | 229 | 21,917 |
| Dacca | 1921 | Pakistan | 4 ² | 1,873 | Oxford | 1811 | Norway | 127 | 5,850 |
| Dalhousie | 1818 | Canada | 141 | 2,000 | Padua | 1167 | England | 731 | 7,794 |
| Dublin | 1591 | Ireland | 404 | 5,914 | Paris | 1222 | France | 152 | 8,260 |
| Edinburgh | 1583 | Scotland | 182 | 3,358 | Pavia | 1257 | Italy | 5 ² | 46,229 |
| Freiburg | 1457 | Germany | 303 | 2,818 | Peiping | 1361 | China | 107 | 4,370 |
| Geneva | 1559 | Switzerland | 185 | 7,946 | Perugia | 1898 | Italy | 789 | 3,535 |
| Genoa | 1243 | Italy | 152 | 2,103 | Prague | 1200 | Italy | 150 | 2,300 |
| Ghent | 1816 | Belgium | 37 | 778 | Queen's | 1348 | Czechoslovakia | 260 | 20,666 |
| Gießen | 1607 | Germany | 535 | 5,122 | Queensland | 1908 | Union of South Africa | 302 | 3,268 |
| Glasgow | 1451 | Scotland | 302 | 3,805 | Rennes | 1841 | Canada | 181 | 3,163 |
| Göttingen | 1737 | Germany | 130 | 4,831 | Rio de Janeiro | 1909 | Australia | 352 | 3,045 |
| Graz | 1586 | Austria | 91 | 1,224 | Salamanca | 1735 | France | 7 ² | 3,045 |
| Greifswald | 1339 | Germany | 120 | 4,500 ⁴ | Salzburg | 1920 | Brazil | 4 ² | 5,770 |
| Grenoble | 1359 | France | 120 | 15,000 ⁴ | Santiago | 1242 | Spain | 120 | 2,134 |
| Havana | 1721 | Cuba | 142 | 4,853 | Sofia | 1623 | Austria | 19 | 287 |
| Heidelberg | 1386 | Germany | 213 | 10,112 | Strasbourg | 1743 | Chile | 600 | 5,284 |
| Helsinki | 1640 | Finland | 362 | 4,244 | Sydney | 1888 | Bulgaria | 235 | 25,688 |
| Innsbruck | 1669 | Austria | 158 | 10,276 | Tokyo | 1566 | France | 230 | 7,128 |
| Istanbul | 1453 | Turkey | 535 | 77 | Toronto | 1857 | Australia | 863 | 10,717 |
| Jena | 1558 | Germany | 77 | 5,000 ⁴ | Tübingen | 1877 | Japan | 1,378 | 17,419 |
| Kyoto | 1897 | Japan | 731 | 7,883 | Uppsala | 1897 | Germany | 174 | 4,304 |
| Lausanne | 1537 | Switzerland | 200 ⁴ | 1,698 | Valencia | 1477 | Sweden | 241 | 4,528 |
| Leiden | 1575 | Netherlands | 201 | 4,175 | Vienna | 1477 | Spain | 264 | 9,784 |
| Leipzig | 1409 | Germany | 10 ² | 4,000 | Warsaw | 1500 | Austria | 313 | 12,374 |
| Leningrad | 1819 | U.S.S.R. | 280 | 7,000 ⁴ | | 1816 | Poland | 301 | 6,756 |
| Liège | 1816 | Belgium | 174 | 2,870 | | | | | |

1 Figures are based on most recent statistics.
2 Number of faculties.

3 Department heads.

4 Estimate.

5 Figure not available.



U.S. Army Signal Corps Photo

TOMB OF THE UNKNOWN IN ARLINGTON NATIONAL CEMETERY

buried in the tomb with full military honors. In May 1958 bodies of unknown soldiers of World War II and Korea were given memorial services and placed in the tomb.

Untermeyer (ŭn'tēr-mŷ-ēr), LOUIS, poet and anthologist, born in New York City, Oct. 1, 1885. Failing to graduate from high school, and renouncing the profession of composer, he worked in his father's jewelry manufacturing establishment for 20 years, then retired, and, after two years of study abroad, devoted himself to literature. He has been literary editor of the *American Mercury* (1934-37) and has delivered groups of lectures at Amherst (1937), at the Univ. of Montana (1939-40), and at Iowa State Univ. (1940). He has contributed to many periodicals, including the *New Republic*, the *Yale Review*, and the *Saturday Review of Literature*. He has published collections of his verse parodies ("The Younger Quire," "Including Horace," and "Collected Parodies"), and has also written serious verse, some indicating deep social consciousness ("Challenge," 1914, and "Roast Leviathan," 1923). He has written a novel ("Moses," 1928), and among his volumes of critical prose is "American Poetry Since 1900" (1927). Untermeyer is best known, however, as an anthologist: "Modern American Poetry" (1919), "Modern British Poetry" (1920), "The Forms of Poetry" (1926), "The Book of Living Verse" (1932), "A Treasury of the World's Great Poems" (1942), and "A Treasury of Laughter" (1946). Untermeyer's poetry, largely derivative in form, reveals craftsmanship and a varied and warm appreciation of life. As an anthologist, particularly of college textbooks, his influence has

been immense on the shaping of poetic taste.

Untermeyer (ŭn'tēr-mŷ-ēr), SAMUEL, lawyer, born in Lynchburg, Va., 1858; died in 1940. Educated at the Coll. of the City of New York and at Columbia Univ. Law School, he was admitted to the bar in 1879 and embarked upon a law career that was to gain for him international prominence. A noted corporation lawyer and political counsel, he figured in several important corporation mergers, was instrumental in framing the Federal Reserve Bill and the Clayton Anti-Trust Act, and helped secure the five-cent subway fare



Courtesy Harcourt Brace & Co., N. Y.

LOUIS UNTERMAYER

in New York City. He made a consistent stand for court reforms, criticized monopolies and social or racial discriminations. For many years a supporter of the Zionist movement and Jewish organizations, he devoted the last years of his life to anti-Nazi activities.

Untouchable (*ūn-tūch'q-b'l*), the lowest class of Indians in the social order, which defines the relative position and the duties of several castes. Actually, the Untouchables do not belong to any caste but are the outcasts of India and were originally identical with the agricultural workers of the Tamil people, living around Madras (see *Brahmanism*).

In April 1947, the Indian Constituent Assembly adopted a resolution providing that untouchability in any form was immediately abolished and that the imposition of any disability on that account would be an offense.

It has been estimated that there were 50,000,000 Untouchables in India.

Upas (*ū'pās*), a tree of the nettle family, which yields an acrid, milky juice that contains a virulent poison, the *upas antiar*. It is native to Java and other islands of the East Indies and several species of it are indigenous to tropical Africa. The stem is naked for the first 50 to 80 ft. and its height often exceeds 100 ft. The leaves are lanceolate and alternate and the fruit is a kind of drupe, covered with fleshy scales. It was long thought that mere contact with the tree would result in injury to animals and plants, but it is known that the poisonous properties are similar in effect to those of the poison ivy. Natives use the juice of the tree in poisoning their arrows.

Upsala (*ūp-sālū*), or UPSAL, a city of Sweden, on the Fyris River, 42 m. N.W. of Stockholm. It occupies a fine site in a fertile valley and may be reached by a number of railways. The Univ. of Upsala, founded in 1477, is the chief educational institution in Sweden. The university library contains a Bible in which Luther and Melancthon wrote comments. The cathedral, founded in 1258, is a beautiful structure in the Gothic style. In it are the tombs of Linnaeus, Gustavus Adolphus, and other prominent men of Sweden. Upsala has beautiful botanical and zoological gardens, numerous secondary schools and churches, the Museum of Northern Antiquities, and the Ultuna Agricultural Institute. Although it has some manufactures and a brisk trade, it is important mainly as an educational center. Population, ca. 45,000.

Upshur (*ūp'shēr*), ABEL PARKER, politician, born in Northampton, Va., June 17, 1790; died Feb. 28, 1844. He studied law at Richmond, was admitted to the bar in 1810, and began a successful practice in that city. In 1824 he was elected to the state legislature and two years later became judge of the general court in Virginia. He was

made Secretary of the Navy by President Tyler, in 1841, and two years later succeeded Daniel Webster as Secretary of State. Owing to his pro-slavery policy, he favored the annexation of Texas. His death occurred by an explosion while on board the *Princeton*, a steamer of the U.S. Navy.

Upton (*ūp'tūn*), EMORY, soldier, born at Batavia, N.Y., Aug. 27, 1839; a suicide Mar. 15, 1881. He studied at Oberlin and the U.S. Military Acad. and joined the Federal Army at the beginning of the Civil War. During the first year of the war he fought at Bull Run and was stationed at Ft. Washington. Later he took part in the Peninsular and Maryland campaigns. He served in the Battle of Antietam, was in the Rapidan campaign, and commanded a brigade in the Battles of the Wilderness, distinguishing himself particularly at Spotsylvania Court House. In 1864 he was transferred to the Shenandoah valley and later in the same year to the West, where he operated successfully until the close of the war. He was commandant at West Point from 1870-75, and in the latter year was sent on duty to Asia and Europe.

Ur (*ōōr*), in archeology, a city near the Euphrates River in Southern Babylonia and today recognized as the capital of Sumeria (*q.v.*). It is mentioned in the Bible as the place of origin of Abraham's family (Genesis 11:27-32). Newer archeological excavations have proved that Ur was the nucleus of the oldest civilization of Asia Minor, older than the Babylonian and Assyrian—the *Sumerian*.

Among archaeological finds were vessels and sculpture, executed in a naturalistic style, which show extreme beauty. The building of houses



SACRED BULL, UR

A steatite figure found during excavations at Ur

URAL

was fairly well developed and even musical instruments have been found. It is probable that in the 3rd millennium B.C. the Sumerian and Babylonian civilizations gradually merged into each other. Sumeria then represented the more southern part of the Babylonian empire, located near the Persian Gulf. Many elements of Babylonian civilization are today recognized as having been originally Sumerian.

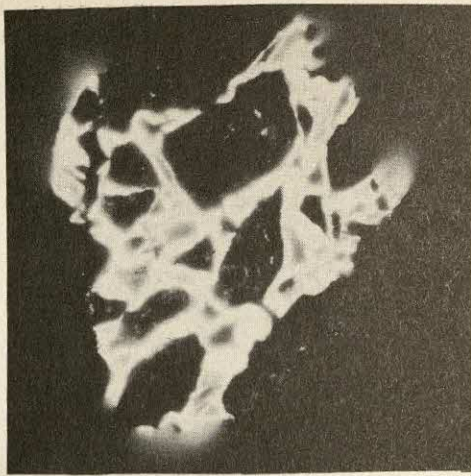
Ural (*ũ'ral*), a river rising in the Ural Mts. and forming a part of the boundary between Asia and Europe. The general course is toward the south. Although it has a length of 1,385 m., it is mostly shallow and flows into the Caspian Sea by a considerable delta. Only a small portion of the river is navigable, but it contains extensive fisheries. The lower course of the river is strongly fortified. Orenburg and Ouralsk are the chief cities on its banks. The affluents include the Or, Kizie, and Sakmara Rivers.

Ural Mountains (*ũ'ral moun'ũnz*), a chain of mountains in Eurasia. Located in the U.S.S.R., they form the boundary between Asia and Europe, stretching southward fully 1,335 m., from the Arctic Ocean nearly to the Caspian Sea. These mountains contain a number of parallel ridges, from which swells and spurs extend at nearly right angles, and attain heights of 4,500 to 5,515 ft. There is a gradual rise from the Kara Sea until the north central part is reached, where the chain attains its highest summits. The slopes are gradual in the greater part of these highlands. Extensive deposits of minerals abound, the most important being coal, iron, copper, platinum, gold; there are also large oil reserves. The northern region has a very cold climate, but the southern part contains valleys of great fertility. Among the streams rising in the Ural Mts. are the Petchora, Kama, Tobal, and Ural Rivers. As a result of the Soviet Five-Year Plans, exploitation of the natural resources of the mountains has been greatly increased, and many industrial cities, including Magnitogorsk (pop., ca. 150,000) have recently been established there.

Urania (*ũ-rũ'ni-ũ*), in Greek mythology, one of the nine Muses, a daughter of Zeus and Mnemosyne. She was the goddess of astronomy and was usually represented with a staff pointing at a celestial globe.

Uranium (*ũ-rũ'ni-ũm*), a chemical element of atomic number 92 and average atomic weight of 238.03. Of the elements found in nature, uranium has the greatest atomic weight and is notable for its tendency to decompose into elements of lesser atomic weight by both radioactive and fission processes.

Uranium occurs chiefly in the form of two ores: pitchblende and carnotite. Pitchblende is a mixture of various substances containing uranium in the form of an impure oxide (U_3O_8), while car-



Courtesy Dept. of Mines & Resources, Canada.

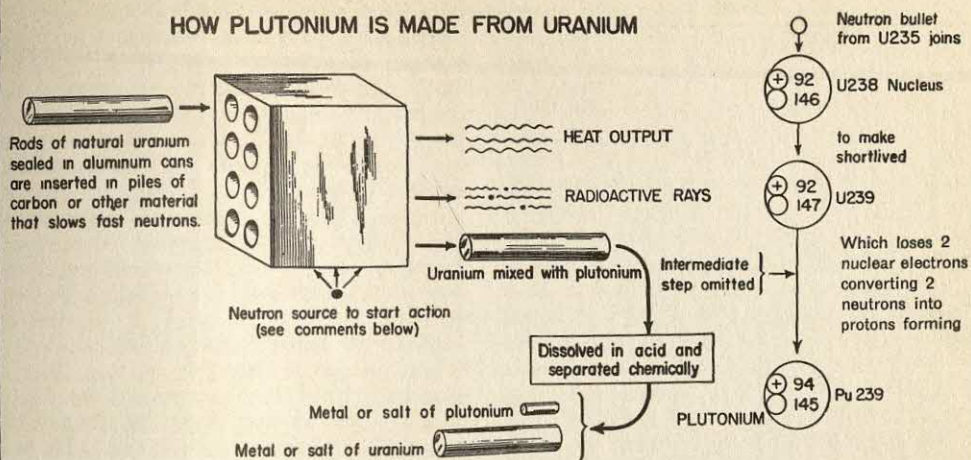
RADIOGRAPH OF PITCHBLEND ORE

notite is a uranium potassium vanadate. Pitchblende is the most important of these ores and is found in relatively large amounts in the region of Great Bear Lake in Northern Canada, in lesser amounts at Katanga in the Belgian Congo and at Jáchymov, Czechoslovakia. Recently, finds of uranium ores were made in the U.S. (Alaska, Colorado, Utah, Wyoming), Canada, Australia, India, and Nigeria. Because of the great importance of uranium in fission reactions, the location of deposits of uranium ores is now of vital concern from an economic and a military point of view. The element is ranked 46th in order of occurrence of elements in the earth's crust. It is about as common as copper but does not occur in a very high-grade ore. Uranium was discovered in 1789 by M. H. Klaproth and given the name *uranium* after the planet Uranus. (For other ores containing uranium, see *Minerals*.)

Metallic uranium is a lustrous white material, malleable and softer than steel. It is seldom prepared, although the elementary substance may be obtained by reducing the oxide secured from pitchblende ores. The element consists of a mixture of isotopes. Uranium 235 is present in small amount mixed with large amounts of the 238 isotope and very small amounts of isotope 234.

Only a few compounds are formed by uranium. Examples of these are: sodium uranate ($Na_2U_2O_7 \cdot H_2O$), uranium nitrate hexahydrate ($UO_2[NO_3]_2 \cdot 6H_2O$), uranium oxide (U_3O_8), trioxide (U_2O_3), and dioxide (UO_2), uranium oxyfluoride (UO_2F_2), and uranium tetrafluoride (UF_4). The oxides were formerly used in the preparation of colored glasses and glazes. Uranium glasses have a beautiful yellowish-green fluorescence. Ferro-uranium has been used in limited amounts in making special steels. Uranium fluoride gas is employed in the separation of isotopes of uranium by thermal diffusion

HOW PLUTONIUM IS MADE FROM URANIUM



methods. Dr. Arthur J. Demster, Univ. of Chicago physicist, was the first to isolate the mass-fissionable uranium isotope, U-235 in 1935.

Uranium undergoes several different types of reactions. Chemical reactions of uranium involve a loss of electrons from the outermost shell of the atom and form compounds in which the oxidation level of the uranium, as indicated in the compounds listed above, may be plus 3, plus 4, plus 6. These chemical changes are relatively unimportant compared to the changes that take place in the nucleus of the uranium atom.

The breakdown of the nucleus of the atom is called radioactivity. This process is accompanied by the loss of positively charged particles (alpha particles), negatively charged emanations (beta rays composed of electrons), and very-high-frequency radiation called gamma rays. The latter are capable of penetrating matter very readily and were responsible for Becquerel's discovery of radioactivity in 1896. The alpha particles are really helium nuclei and take up electrons to form elementary helium. Other products produced in succession in the radioactive decomposition of uranium are several species of radioactive uranium, radium, radon, and finally lead. Some lead is always found in uranium ores, and the amount of lead present serves as the basis of one of the methods of estimating the age of the earth. It is assumed that the beginning of the radioactive process producing lead was coincident with the formation of the earth and that the measurable rate of the reaction has been unchanged since that time. By measuring the rate of the decomposition and the amount of lead present in a uranium ore one can calculate the length of time required to have produced the lead.

A second type of nuclear reaction is called *fission*. In a nuclear fission the nucleus actually breaks apart, producing two or more elements

of smaller atomic weight and releasing small particles of unit mass and no charge called neutrons (*q.v.*). Accompanying the process is a tremendous release of energy and the actual disappearance of small amounts of mass. Uranium was first caused to undergo fission in 1942. Hahn and Strassman in Germany definitely showed that U-235 decomposes to give barium, krypton, and neutrons when struck by a slow neutron. The neutrons released by the disintegrating nucleus have a very high energy and are not capable of causing the decomposition of other atoms which they strike. They may be slowed down by a moderator, however, until they have just the right amount of energy to explode a second U-235 atom on striking it. If the neutrons from the second uranium atom are slowed down the proper amount by collisions with a moderator (a light element like carbon) they may explode other U-235 atoms and thus give rise to a chain reaction. This chain reaction, if properly controlled, may yield large amounts of useful energy, but if the reaction is uncontrolled, huge amounts of energy may be released practically instantaneously, causing a powerful explosion. The latter type of chain reaction was employed in the atomic bomb used toward the end of World War II. The tremendous amounts of energy come from the annihilation of small amounts of matter. These small amounts of mass are not accounted for by the sum of the masses of the fragments of the uranium. The units containing moderator and pieces of uranium in which these chain reactions are carried out are called *piles*.

A third type of nuclear reaction involves the absorption of a neutron by the nucleus of an atom with the subsequent release of beta rays from the excited nucleus causing an increase in atomic number. The trans-uranium elements (elements having greater atomic number than uranium)

are prepared in this way. For example, uranium 238 absorbs a neutron producing an unstable uranium isotope having a mass of 239. This isotope emits an electron and two neutrons from the nucleus, becoming a new element, *neptunium* (Np), of atomic number 93 and mass of 237. Neptunium is also relatively unstable and emits a beta ray (electron) and captures neutrons to become a second new element *plutonium* (Pu), having an atomic number of 94 and a mass of 242. Elements 95 to 103 (inclusive) have been prepared and isolated in the same way. All of these elements have been discovered, isolated, and studied since 1940. Of them, plutonium is fissionable and therefore of vital importance. See also *Atomic Bomb*; *Atomic Energy*; *Atomic Weight*.

Uranus (*ŭ-rā-nŭs*), or COELUS, in Greek legends, the deity representing the light and air of heaven. He is sometimes mentioned as the son of Gaea, the earth, but chiefly as her husband. Classical writers represent him as the father of Oceanus, Saturn, the Cyclops, Themis, Mnemosyne, and Tethys. Since he had a feeling of natural aversion to his children, he confined them in Tartarus, but Gaea induced Cronos, the youngest of the Titans, to mutilate and dethrone him. It is recounted that Gigantes sprang from drops of his blood, and that Venus was evolved from the foam that surrounded him while he swam in the sea.

Uranus, one of the superior planets, located between Saturn and Neptune. It was unknown to ancient astronomers and was discovered March 13, 1781, by William Herschel while exploring the sky with a 7-in. reflector he had made. His attention was attracted by an object in the constellation Gemini, which showed a disk different from a star. He assumed it to be some sort of a comet because it moved from night to night among the stars. After several months the orbit was computed by Lexell, and this showed that the object was moving in a nearly circular orbit larger than that of Saturn. In honor of the king, Herschel called the new planet Georgium Sidus but the designation "Uranus" prevailed.

The planet's distance from the sun is, on an average, 19.19 times that of the earth to the sun, or 1,786,000,000 m. It describes its orbit around the sun in 84 years. Its diameter is four times as large as that of the earth and its mean density only 1.26 times that of water. It turns in 10.7 hours around an axis which is almost in the plane of the orbit. It is attended by the five satellites Miranda, Ariel, Umbriel, Titania, and Oberon, which are extremely faint and also move in a plane nearly at right angles to the plane of the solar system, a unique feature among satellites. Their periods of revolution around Uranus vary between 34 hours (Miranda) and 13 days 11 hours (Oberon). See *Satellite*.

Urban (*ŭr'ban*), the name of eight Popes who reigned as bishops of Rome in the period between 223 and 1644. URBAN I reigned from 223 to 230 and is thought to have suffered martyrdom. URBAN III was Pope from 1185 to 1187 and was succeeded by Gregory VIII. URBAN IV succeeded to the pontificate in 1261 and in 1265 was succeeded by Clement IV. URBAN VII was elected Pope on Sept. 15, 1590, but died before consecration, on Sept. 27, 1590. The other Popes of the same name are treated in the articles following. See *Pope*.

Urban II, Pope of Rome, born in Lagery, France, about 1042; died July 29, 1099. He was educated for the church and entered the cloister at Cluny, of which he became prior. Gregory VII made him cardinal of Ostia in 1078. He was elected Pope at Tarracina in 1088, when Rome was in possession of the anti-Pope, Clement III. The important events of his pontificate include the expulsion of his rival, Clement III, from the fortresses of Rome and his connection with the first Crusade, which united Christendom into a vast warlike confederacy under the Pope. His decision and energy caused the capture of Jerusalem by the Crusaders, but he died 14 days after that event took place.

Urban V, Pope of Rome, born in Grisac, France, in 1309; died in Avignon, Dec. 19, 1370. He was a Benedictine monk, subsequently taught at Montpellier and Avignon, and for some time was abbot of St. Victor in Marseilles. Later he served as papal legate in Naples and Sicily. He was elected Pope on Oct. 28, 1362, as successor to Innocent VI. His pontificate is noted for the masterful effort made to restore the papacy to Italy and he was the last of the Popes to reside at Avignon. He transferred the papal seat to Rome in 1367. He was succeeded by Gregory XI.

Urban VI, Pope of Rome, born in Naples, Italy, in 1318; died Oct. 15, 1389. He was a devout and learned monk and in 1377 became archbishop of Bari. The people of Italy demanded the election of an Italian Pope, and this was a large part of the reason why he was chosen to succeed Gregory XI in 1378. His zeal to carry out reforms produced organized opposition among the cardinals, thus causing a schism in the Church that was not overcome until 40 years later. Twelve French and three Italian cardinals formed a union against the newly elected Pope and, after repudiating their previous action, elected Robert of Geneva, who assumed the title of Clement VII. Urban continued to hold his seat at Rome, while Clement officiated at Avignon. The two Popes excommunicated each other and continued to maintain authority over the two divisions of the Church, each resorting to extreme measures in order to maintain his claim. Clement was put to

flight by troops sent against him from Rome, but Charles, king of Naples, began to resist the papal pretensions and caused Urban to be besieged at Nocera, whence he afterward fled to Genoa.

Urban VIII, Pope of Rome, born in Florence, Italy, in 1568; died July 29, 1644. He was descended from a wealthy Florentine family, who gave him a liberal education. After holding several important charges in the church, he was elected as successor to Gregory XV in 1623. His pontificate of 21 years includes the most important period of the Thirty Years' War, and it is due to him that the temporal power of the papacy was retained in Italy. During his tenure Galileo was summoned to Rome to make his celebrated recantation (1633). Urban VIII did much to improve the city of Rome, enlarged the Vatican library, and founded the College of the



URBAN VIII

Propaganda. He wrote a number of Latin verses and hymns and several comments on the Scriptures.

Urbana (*ûr-bân'q*), county seat of Champaign County, Illinois, 125 m. s.w. of Chicago, on the New York Central, the Wabash, and the Illinois Terminal (interurban) R.R.'s. It is the seat of the Univ. of Illinois and has several factories which manufacture athletic equipment. It is surrounded by a rich farm area specializing in production of soybeans, corn, hogs, and beef and dairy cattle. Urbana adjoins the city of Champaign. It has five parks comprising over 100 acres. The place was settled in 1822 and incorporated as a town in 1833 and as a city in 1860. Population, 1940, 14,064; in 1950, 22,834.

Urbana, county seat of Champaign County, Ohio, 94 m. n.e. of Cincinnati, on the Pennsyl-

vania, the Erie, and the New York Central R.R.'s. It is surrounded by a fertile farming and dairying country. Urbana Junior Coll. is located here. Manufactures include strawboard, food products, tools and dies, machinery, and furniture. Urbana was laid out in 1805. It was incorporated as a village in the same year and as a city in 1867. Nearby are the Ohio Caverns. Population, 1940, 8,335; in 1950, 9,335.

Urbino (*ûr-bē'nô*), a town of Italy, in the Apennine region of Marches, about 20 m. from the Adriatic Sea. It is situated between the Foglia and Metauro Rivers, near the valley of the latter. Its magnificent palace was formerly occupied by the dukes of Urbino, and surrounding it are walls dating from the 14th century. The Albini palace, built by an Albanian family, is also at Urbino. This family furnished one of the popes, Clement XI. The Univ. of Urbino was founded in 1564. Urbino manufactures pins, matches, earthenware, utensils, and pottery. The city dates from the time of the Romans and in the Middle Ages became the seat of independent dukes. It was made a part of United Italy in 1860. Population, ca. 20,000.

Urchin (*ûr'chîn*). See *Sea Urchin*.

Uremia (*û-rē'mē-â*), in medicine, a disease characterized by retention in the blood of certain waste products which under normal circumstances are excreted by the kidneys. It is caused by certain diseases of the kidney. Symptoms are convulsions, vomiting, and general dizziness. See *Eclampsia*.

Urethra (*û-rē'thrâ*), in anatomy, the small tube through which the urine is discharged from the bladder.

Urey (*û'rî*), HAROLD CLAYTON, chemist, born in



Courtesy N. Y. Academy of Medicine

HAROLD C. UREY

Walkerton, Ind., April 29, 1893. A graduate (1917) of the Univ. of Montana, he taught at Johns Hopkins Univ. (1924-29) and at Columbia Univ. (1929-45). Since 1945 he has been professor of chemistry at the Univ. of Chicago. Urey won the 1934 Nobel Prize in chemistry for his discovery of heavy hydrogen (deuterium). He did research concerning the structure of atoms and during World War II worked with the scientists who produced the atomic bomb (*q.v.*). Urey was editor of the *Journal of Chemical Physics* (1933-40); with A. E. Ruark he wrote "Atoms, Molecules, and Quanta" (1930).

Urfa (*öör-fä'*), a city in Turkey, about 170 m. E. of Adana. It is the trading center for a large agricultural area and has cotton-weaving and tobacco industries. Known in ancient and medieval times as Edessa, the city was the capital of a kingdom (132 B.C.-A.D. 216). In the 1st Crusade it was taken (1098) by the Franks and was the eastern bulwark of the kingdom of Jerusalem until 1144 when it was captured by the Moslems; it became a part of Turkey in 1639. In the late 19th century Urfa's Christian Armenian population suffered terrible massacres. Population, 1950, 37,456.

Urfé (*ür-fä'*), HONORÉ D', author, born in Marseilles, France, Feb. 11, 1567; died in Villefranche-sur-Mer, June 1, 1625. He was of noble descent and spent much of his life in the service of the duke of Savoy. D'Urfé is best remembered for the "*Astrée*" (5 vols., 1610-27), an extremely long pastoral novel in which shepherds and shepherdesses discourse with delicacy and sophistication on the problems of love. This novel had a profound influence on 17th-century European literature, not only in the field of romance but also in the drama.

Uri (*öör-ré*), one of the four forest cantons of Switzerland (area, 415 sq. m.), in the east-central part of the country. Uri is crossed by the Reuss River and the St. Gotthard Ry. Its inhabitants are predominantly Roman Catholic and German-speaking. In 1291, with Schwyz and Unterwalden, Uri formed a confederation which was the nucleus of the Swiss nation. Uri is associated with the legend of William Tell (*q.v.*). In 1799 it was the scene of battles between the French and the Russians and Austrians. The capital and chief town is Altdorf (population, 1941, 5,692). Population, 1950, 28,556.

Uriah (*ü-rī'g*), in the Bible, a Hittite officer in King David's army, the husband of Bathsheba (*q.v.*). David ordered his general, Joab, to abandon Uriah in the thick of battle, and Uriah was killed (II Samuel 11).

Uric Acid (*ü'rik ä'sid*) or TRIKETOPURINE, the end product, in man, of the metabolism of nucleoproteins, which are normal constituents of all living cells, especially of cell nuclei. Foods

such as sweetbreads, liver, kidney, anchovies, meat extracts, turkey, and sardines are especially high in purines. A normal constituent of blood and urine (*qq.v.*), uric acid may reach a level higher than normal either because of increased ingestion of purine-containing substances, or because of a failure to excrete what is formed. Uric acid retained in the blood is deposited in the tissues as crystals (urates), producing changes in joints, bones, lobes of the ears, and kidneys. The result is a condition called gout (*q.v.*). Urates in blood vessels seem to increase arteriosclerosis (*q.v.*).

Urim and Thummim (*ü'rim, thūm'im*), the name of two unidentified objects mentioned several times in the Bible (Exodus 28:30; Leviticus 8:8; Numbers 27:21). They may have been small carved stones worn by the high priest in a pouch under his breastplate and used as sacred lots when he wished an oracle of God's will. According to Joseph Smith (*q.v.*), Urim and Thummim were a pair of magic spectacles which he used in reading the golden plates alleged to have contained the Mormon scriptures. See also *Mormons*.

Urine (*ü'rin*), the fluid secreted from the blood by the kidneys in man and the higher mammals. The formation of urine is a continuous process, but it passes in spurts from the kidney pelvis through the ureters, to be collected and stored in the bladder, from which it is passed at intervals. The amount passed in one day is about two and a half pints. The amount is increased by an increased fluid intake, in diabetes, after the drinking of large quantities of tea, coffee, or beer, and during periods of emotional stress. It is decreased during excessive perspiration, in diarrhea, after vomiting, during shock, and in many of the acute fevers. Normal urine is clear when passed, is faintly acid, amber in color, and contains many of the waste products of body activity. The ingestion of large quantities of bicarbonate of soda or of unusual amounts of fruit juices may turn the urine alkaline and cause it to appear cloudy. The color and odor are affected by certain foods, particularly asparagus.

The urine, from the time of primitive medicine, has been examined as an aid in the detection of disease. It alerts the physician to the presence of disease both in the urinary tract and throughout the body. See *Kidney*; *Uric Acid*.

Urmia (*öör-mī-g*). See *Rizaiyeh*.

Urmia, LAKE. See *Urumiä*.

Urn (*ērñ*), a name for a type of vessel or receptacle in the shape of a vase with or without a base. Molded in baked clay, urns have been in use since prehistoric times; in ancient Greece they were made of glazed terra cotta. Urns were originally intended for the preservation of the ashes of cremated bodies and are still used for this purpose today. They also served as recep-



Courtesy Moore-McCormack Lines

MONUMENT TO THE PIONEERS OF THE PRAIRIES, NEAR MONTEVIDEO, URUGUAY

tacles for oil, grain, etc. and as decorative pieces. Ornamental urns are characteristic of the Empire style of interior decoration.

Ursa Major and Ursa Minor (*úr'sà mǎ'jēr, mǎ'nēr*). See *Bear, Great and Little; Dipper*.

Ursins (*úr'sàn*), MARIE ANNE DE LA TRÉMOILLE, PRINCESSE DES, court lady and unofficial diplomat, born in France in 1642; died in Rome, Italy, Dec. 5, 1722. After the death of her second husband, Flavio Orsini, duke of Bracciano, she adopted the title *princesse des Ursins*, a corruption of Orsini. She arranged the marriage (1701) between María Luisa of Savoy and Philip V of Spain, in whose court she exerted much power and influence until the queen's death in 1714. It was largely due to her influence at the court of Louis XIV that Philip remained on the Spanish throne during the War of the Spanish Succession (*q.v.*).

Ursúa (*ōor-sōō'ā*), PEDRO DE, conquistador, born near Pamplona, in Navarre, Spain, *ca.* 1510; killed at Machiparo, on the upper Amazon, Jan. 1, 1561. He came to New Granada about 1544 and was governor there (1545-46). From Bogotá he made two expeditions (1547, 1549-52) in search of El Dorado (*q.v.*) and the legendary kingdom of Omaguas, founding Pamplona (in Colombia) and other settlements. In 1560 the viceroy of Peru sent Ursúa on a quest for El Dorado on the Amazon headwaters. During the voyage a band of mutineers murdered Ursúa.

Ursula (*úr'sū-lǎ*), SAINT, Christian martyr, possibly of the 4th century. Of the many legends associated with her name, the most popular, recounted by Geoffrey of Monmouth (*q.v.*), is that she was the daughter of a Christian king of Great Britain and that she was one of 11,000 virgins slaughtered by the Huns at Cologne, Germany. Saint Ursula's feast day is celebrated on Oct. 21.

Ursulines (*úr'sū-līnz*), a teaching order of Roman Catholic nuns, founded in Brescia, Italy, in 1535, by St. Angela Merici. The purpose of the order is the education of young girls. Pope Paul III confirmed the foundation of the order in 1544. In 1639 the first Ursuline convent in the Western Hemisphere was founded at Quebec, and the first school for girls in Louisiana was founded by Ursulines in 1727.

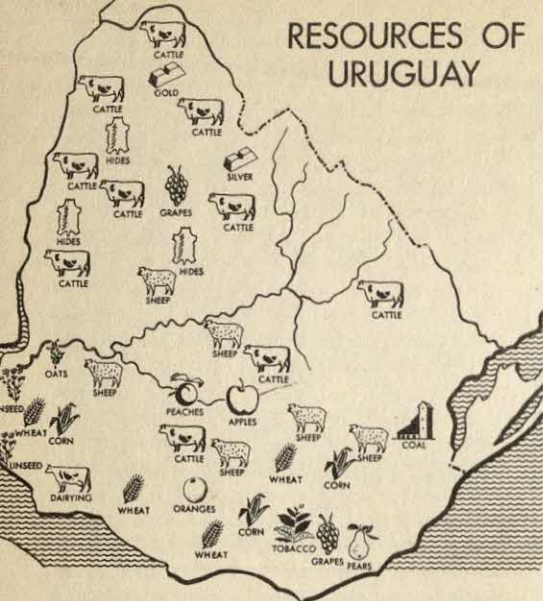
Urticaria (*úr-tī-kār'i-q*). See *Hives*.

Uruguay (*úr-ū-gwī*), a river of southeastern South America, rising in the state of Santa Catarina in southeastern Brazil; it flows west, south-west, and south, forming the boundaries of Brazil and Uruguay with Argentina, and empties into the Río de la Plata. The Uruguay is about 980 m. in length and is navigable for about 200 m. from its mouth to Salto, Uruguay, and for small vessels for an additional 300 m. Its chief tributaries are the Río Negro and the Ibicuí.

Uruguay, a republic of South America, the smallest and most densely populated of the South American republics. It is bounded on the N.E. by Brazil, on the W. by Argentina, from which it is separated by the Uruguay River, on the S. by the Río de la Plata, and on the S.E. by the Atlantic Ocean. Its area is 72,172 sq. m.

DESCRIPTION. The surface of Uruguay is gentle, rolling land, in the south an extension of the Argentine Pampa, in the north slightly more hilly. Several chains of hills, at no point more than 2,000 ft. in elevation, form dividing lines. Woodland occurs in the north—where there are small groves of poplar, willow, and eucalyptus trees—and along the river banks. The Uruguay River is the country's most important waterway; it is fed by many tributaries, of which the Río Negro is the largest. The southeastern coastal region is dotted with a series of lakes, all near the ocean; this region is also noted for its exten-

RESOURCES OF URUGUAY



Courtesy Office of Inter-American Affairs, Wash., D. C.

sive palm groves and beautiful sandy beaches. Farther north and inland lies Lake Merín, forming in part the boundary with Brazil.

Uruguay has a mild, subtropical climate; in the coastal regions warm summers and mild winters are the rule, while in the interior summers are quite hot and winters cool, with occasional freezing temperatures. Rainfall averages 35 in. annually.

AGRICULTURE, INDUSTRIES, AND RESOURCES. With plentiful water, fertile soil, and excellent grazing, Uruguay is almost entirely a livestock-raising country. Cattle and horses were imported at the beginning of the 17th century, and later sheep were brought from England. More than 60 per cent of the country is devoted to stock raising, 20 per cent to ranches and mixed farming, and only about 7 per cent to agriculture. In normal times beef, mutton, wool, and hides account for 85 per cent of Uruguay's exports, the bulk of which go to Europe. In the southern part of the country, near Montevideo and along the Río de la Plata, there is considerable diversified farming, in which dairy products, cereal grains, citrus fruits, linseed, and wine grapes are produced. The major industry is the packing and processing of meat. Beverages, textiles, metallurgical products, paper, chemicals, and leather goods are produced in quantity, but all machinery, automobiles and rolling stock, coal, and petroleum products must be imported. A hydroelectric plant with a capacity of 120,000 kilowatts was constructed in the 1940's on the Río Negro in central Uruguay. There are small resources of gold, silver, copper, lead, manganese, and iron; none of these have been thoroughly developed. A considerable source of revenue is the tourist industry; Uruguay's many beautiful beach resorts and modern hotels

URUGUAY

attract large numbers of vacationers from Argentina, Brazil, the U.S., and Europe.

Transport routes include ca. 775 m. of inland waterways, ca. 3,000 m. of paved highways, and ca. 1,500 m. of state-controlled railroads.

POPULATION. The population of Uruguay is predominantly of southern European origin, coming chiefly from Spain, Italy, and Portugal. Other nationalities which are strongly represented are Brazilians, Argentines, French, British, Germans, and Swiss. There are no pure-blooded Indians in Uruguay; the strong and independent Charrúas were destroyed in colonial times, and other tribes were soon assimilated into the population. The national language is Spanish, and the prevailing religion is Roman Catholicism. However, there is complete freedom of religion, guaranteed by law. Montevideo, on the estuary of the Río de la Plata, is the capital and largest city, with a population of some 784,000 persons. Other cities include Salto (pop., ca. 46,000), Mercedes (pop., ca. 30,000), Paysandú (pop., ca. 46,000), and the beautiful resort town, Atlántida. Population, 1949 (est.), 2,353,000.

EDUCATION. Primary education is compulsory, and both primary and advanced education are free. There are more than 1,600 public schools, with an annual enrollment of over 190,000 pupils. Uruguay has a very low rate of illiteracy, which is confined chiefly to the older age groups in the rural areas. The Univ. of the Republic at Montevideo, opened in 1849, has faculties of law, medicine, social science, dentistry, pharmacy, chemistry, architecture, engineering, economics, and agriculture; tuition is free to Uruguayan and foreign students. Other educational institutions include parochial schools and seminaries, a college of arts and trades, five normal schools for the training of teachers, and a military institute.

GOVERNMENT. The government is based on a constitution adopted in 1934 and revised in 1942 and 1951; in the last-named year the presidency was abolished, and all executive power was vested in a bipartisan national council of nine members, elected for four years. There is a parliament consisting of two houses: the senate, whose 30 members are elected at large for four-year terms; and a chamber of representatives, with 99 members elected from districts, also for four years. The 30 seats in the senate are divided equally between the two political parties receiving the greatest number of votes. There is universal suffrage; votes were granted to women in 1934. Uruguay is divided into 19 departments, or provinces, each of which is ruled by an executive appointed by the national council. Local legislation is vested in an administrative council for each department, whose membership is chosen by popular vote.

The peso is the Uruguayan unit of currency (see *Coinage*).

Military service for one or two years is voluntary for men between 18 and 45, and it is estimated that 120,000 men could be mobilized in time of war. The navy includes some 1,500 men, and there is a small air force.

HISTORY. The first settlement in Uruguay was made (1624) by Spanish Jesuits at Soriano, near the mouth of the Río Negro. Permanent settlement by Spanish colonists did not begin until the 18th century; Montevideo was founded in 1726, and Uruguay had a population of about 30,000 by 1800. The region became a Spanish province called Banda Oriental, i.e., "Eastern Shore." A movement for independence (1811-20) secured the liberation from Spain of the Banda Oriental, but the region was annexed by Brazil in 1821. In 1825 Uruguay rebelled against Brazilian rule, and after a bloody struggle she was recognized (1828) by both Brazil and Argentina as an independent state. The first Uruguayan constitution was adopted in 1830. During the next forty years the country went through a period of extreme unrest, amounting at times to virtual anarchy, which was brought about by the attempts of foreign powers (Argentina, Brazil, Paraguay, France, and Great Britain) to control or dominate her government. After 1870 Uruguayan politics were marked by periodic struggles between the two major political parties. Under the administration (1903-15) of Pres. José Batlle y Ordóñez, Uruguay began the program of socialist reform which has made it one of the most stable and prosperous nations of Latin America. In World War II Uruguay declared war on Germany and Japan, and in 1945 she became a member of the U.N. On April 30, 1948, Uruguay signed the Charter of the Organization of the American States (see *Pan-American Union*).

Urumiya (ōō-rōō-mē-yē') or URMIA, a shallow salt lake in northwestern Iran, in Azerbaijan, west of Tabriz. It is 85 m. long and 25 m. wide, but its area varies seasonally from about 1,500 sq. m. in summer to about 2,300 sq. m. in winter. Because it has no outlets, the lake is intensely salty and supports no fish or mollusk life. It contains many small islands. The nearby city of Rizaiyeh (q.v.) was formerly called Urumiya or Urmia.

Uspallata Pass (ōōs-pä-yä'tü pās) or LA CUMBRE, a pass over the Andes Mts., connecting Mendoza, Argentina, with Santiago, Chile. Used as a trail for men and beasts of burden before the opening (1910) of the Transandine Ry., the pass was the route taken by José San Martín (q.v.) in his invasion (1817) of Chile. It is the site of the "Christ of the Andes," a large statue erected (1904) to commemorate the settlement of a boundary dispute between Chile and Argentina. At its highest point the pass is about 13,082 ft. above sea level.

Uspensky (ū'shū'skē), GLEB IVANOVICH, novelist, born in Tula, Russia, Oct. 13, 1840; died (a suicide) in St. Petersburg in 1902. One of the principal Russian populist authors, he is best remembered for his realistic novel of village life, "The Power of the Soil" (1882). He also wrote "From a Village Diary" (1877), in which he portrayed the breaking up of village life under the impact of industrialism. A commoner by birth, he was familiar with the peasants and the suburban lower classes about whom he wrote.

Usury (ū'shū-rē), a term originally applied to the practice of lending money at interest, but now restricted to the charge of excessive rates of interest and to rates higher than those allowed by law. Legislation on the subject of usury dates from ancient times, but the practice attracted the most attention in the Middle Ages. In Athens, Solon canceled all the debts made on the security of the person or land of the debtor and established a law that subsequent loans could not be made on the bodily security of the borrower, but instead provided that the creditor should be limited to property security. Aristotle was persistent in the opinion that no profit should accrue to the lender of money, a view approved quite generally by the Church throughout the Middle Ages. At present all nations recognize money lending as an honorable enterprise, but protect the borrowers by limiting interest charges to reasonable rates. In most instances the legal rate is from 5 to 6 per cent, though rates ranging from 6 to 12 per cent may be charged in case the contract so specifies. Contracts providing a rate of interest greater than that allowed by statutory law are not collectible in the courts.

Utah (ū'tā), a state in the Mountain section of the U.S. Prior to World War II, Utah was known primarily as a mining and farming state. Since that time, however, manufacturing has become a major sector of the economy, although the sales and services sector employs more Utah workers than any other. Utah is familiar as the homeland of the Mormon Church and as the locale of several natural wonders, including the Great Salt Lake, spectacular erosion phenomena, and some of the nation's highest mountains.

Utah is bounded on the N. by Idaho and Wyoming, on the E. by Wyoming and Colorado, on the S. by Arizona, and on the W. by Nevada. Four states (Utah, Colorado, New Mexico, and Arizona) meet at its southeastern corner, in the only such junction in the U.S. It ranks 11th in size among the states and 37th in population, according to the 1958 estimates of civilian population (Alaska, Hawaii, and the District of Columbia included in both rankings). The state's name comes from that of a Shoshonean Indian tribe, the Utes, meaning "those who live high in the mountains." Its nickname is the "Beehive State,"

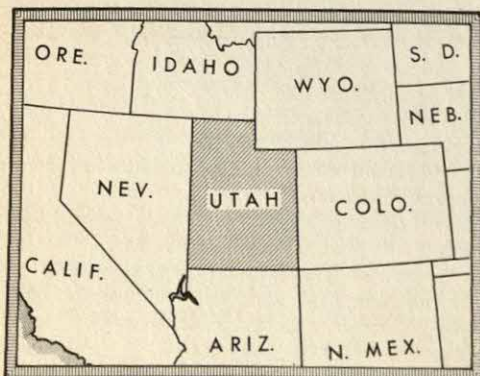


from the beehive, the Mormon-chosen emblem of industry.

| | |
|------------------------------------|--|
| Location | Between 109°3' and 114°4' W. long. and 37° and 42° N. lat. |
| Area | 84,990 sq. m. |
| Land | 82,184 sq. m. |
| Inland water | 2,806 sq. m. |
| Greatest extent: | |
| North to south | 345 m. |
| East to west | 275 m. |
| Population (1950) | 688,862 |
| Capital city | Salt Lake City |
| Highest point | Kings Peak (13,498 ft.) |
| Lowest point | Beaverdam Creek (2,000 ft.) |
| Admitted to the Union (45th state) | 1896 |
| Song | "Utah, We Love Thee," words and music by Evan Stephens |
| Flower | Sego lily |
| Bird | Sea gull |
| Motto | "Industry" |
| Flag | See color plate in Vol. XI |

GEOGRAPHY

Utah is a part of the high intermountain plateau between the Sierra Nevada and the eastern Rocky Mts., cut up by mountain ranges and ancient erosion canyons. Much of its surface is nonirrigable desert. The state may be divided, broadly, into three major areas.



Approximately the eastern third of the state is on the Colorado plateau, a high dry region which extends north, east, and south into Wyoming, Colorado, New Mexico, and Arizona. This area, until recently largely unexploited, has increasingly become a center of prospecting for and production of petroleum, natural gas, and uranium.

The Rocky Mt. area, averaging some 50 m. to 60 m. wide, runs north and south through the center of the state along the Wasatch Range, with an eastward projection (ca. 30 m. wide by 50 m. long), including the Uinta Mts., to the east of Salt Lake City. The highest mountains are in the Uintas; besides Kings Peak (13,498 ft.), other notable peaks include Mt. Emmons (13,428 ft.), Gilbert Peak (13,422 ft.), Mt. Lovenia (13,227 ft.), and Red Castle (13,134 ft.). The Wasatch Range traps moisture-laden winds from the Pacific; some of the higher Wasatch and Uinta peaks keep snowcaps much of the year. The region of heavy settlement, northward and southward from Salt Lake City, clings closely to the Wasatch Range, where mountain streams provide ready irrigation; in this area, most standard field crops may be grown.

The western third of the state is included in the Great Basin, a barren area extending westward into Nevada and generally known as the Great American Desert, in which all the streams either evaporate in the sands or fall into alkali or saline sinks, of which the Great Salt Lake is the most conspicuous example. The smaller area called the Great Salt Lake Desert is the bed of prehistoric Lake Bonneville, of which Great Salt Lake is a remainder. About 100 m. due w. of Salt Lake City lie the Bonneville Salt Flats, whose unimpeded dead-levels provide a race track for automobile speed and endurance tests.

A small portion of the northeastern corner of the state is in the Wyoming basin, an area of not too rugged terrain principally valuable for cattle and sheep ranching. The northwestern corner of the state belongs to the Columbia River drainage basin, with the headwaters of the Raft River draining northward into the Snake River and then on into the Columbia.

The principal rivers of the state are the Bear, Colorado, Green, Jordan, Provo, San Juan, Sevier, and Weber. The Green River enters the state in its far northeastern corner (near the Utah-Wyoming-Colorado border) and flows generally southward through Desolation Canyon to join the Colorado River in the southeastern portion of the state. The Colorado River enters the state about midway on its eastern border and leaves it about midway on its southern border, a short distance before entering the Grand

Canyon in Arizona. The Bear River, which enters the state from southeastern Idaho, and the Weber River, flowing from the northeast, both empty into Great Salt Lake, as does the Jordan River, which flows northward from Utah Lake, the only considerable fresh-water lake entirely in the state. Another sizable fresh-water lake, Bear Lake, lies in Utah and Idaho. The major portion of the lake formed by the Glen Canyon Dam, in 1959 under construction on the Colorado River in northern Arizona, was designed to extend upstream 175 m. into Utah, overshadowing both Utah and Bear lakes. The Great Salt Lake, ca. 40 m. to 50 m. wide, 75 m. long, and nowhere more than ca. 50 ft. deep, is noted for being some 25 per cent salt. For this reason, it supports only a few most elementary forms of marine life and will float on its surface many ordinarily submersible things, including human beings.

Climate: Because of the north-and-south length of the state (345 m.) and a wide range of altitudes (from 2,000 ft. to over 13,000 ft.), there are considerable variations in climate. In the hot and dry southern section of the state, temperatures seldom fall to freezing in winter and in summer go to tropical extremes, as high as 112° F. On the high plateaus and in the mountains, winters are severe and summer temperatures comfortable (with a mean seldom over 80° F.). In the mountains, changes of weather and temperature are likely to be sudden and extreme. In the fertile settled areas along the base of the mountains, temperatures range from zero in winter to ca. 90° F. in summer (but with low humidity). Annual precipitation ranges from 5 in. in the desert to more than 40 in. near Brighton, a mountain resort 25 m. s.e. of Salt Lake City (8,000 ft. above sea level).

| | |
|--|-----------|
| Normal temperature, Salt Lake City | |
| January | 26.5° F. |
| July | 76.6° F. |
| Annual mean | 51.3° F. |
| latest frost, Salt Lake City | April 30 |
| Earliest frost, Salt Lake City | Oct. 11 |
| Precipitation, Salt Lake City | |
| January | 1.20 in. |
| July | 0.97 in. |
| Annual | 14.74 in. |
| Average growing season, Salt Lake City | 192 days |

NATURAL RESOURCES

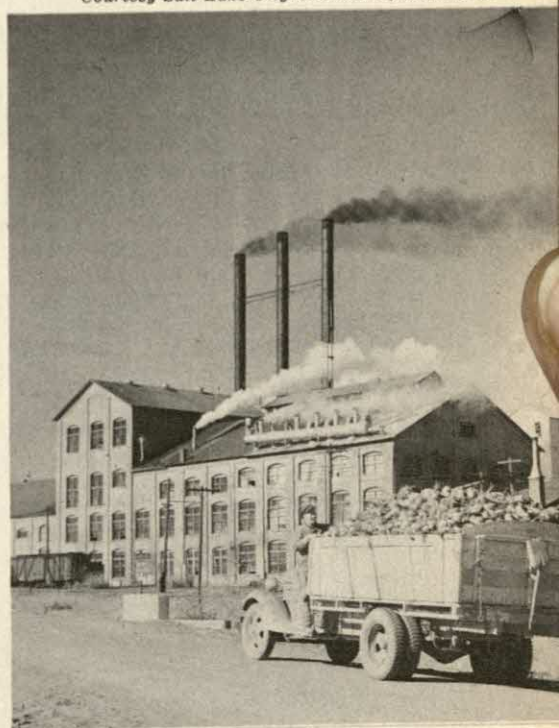
Utah is rich in natural resources. In 1956 it ranked 13th in the nation in the production of all minerals. In the same year it ranked second in the production of copper (the world's largest open-pit copper mine is at Bingham Canyon, ca. 25 m. s.w. of Salt Lake City), second in gold, third in lead and silver, fourth in zinc, ninth in salt, and 12th in coal production. Petroleum and

uranium have recently been discovered and exploited, although the oil figures are still not large and the uranium figures are not disclosable. Utah's known mineral-salts deposits, as yet largely unexploited, are valued at several billion dollars and promise to make the state a major producer of potash and related products. Other natural resources include marble, semiprecious stones, onyx, sulfur, iron ores (a major steel plant is located at Geneva, on Utah Lake), and phosphate rock. There is some timber, mostly in national forests (totaling, in 1957, ca. 9,000,000 acres); the higher elevations grow fir, spruce, and pine, the lower slopes support juniper, piñon, and scrub cedar. Water is an important resource, controlled since the earliest settlements; any claim for new surface or subsurface water must be filed at the state capital.

UTAH SUGAR FACTORY

Refining of beet sugar is a major industry

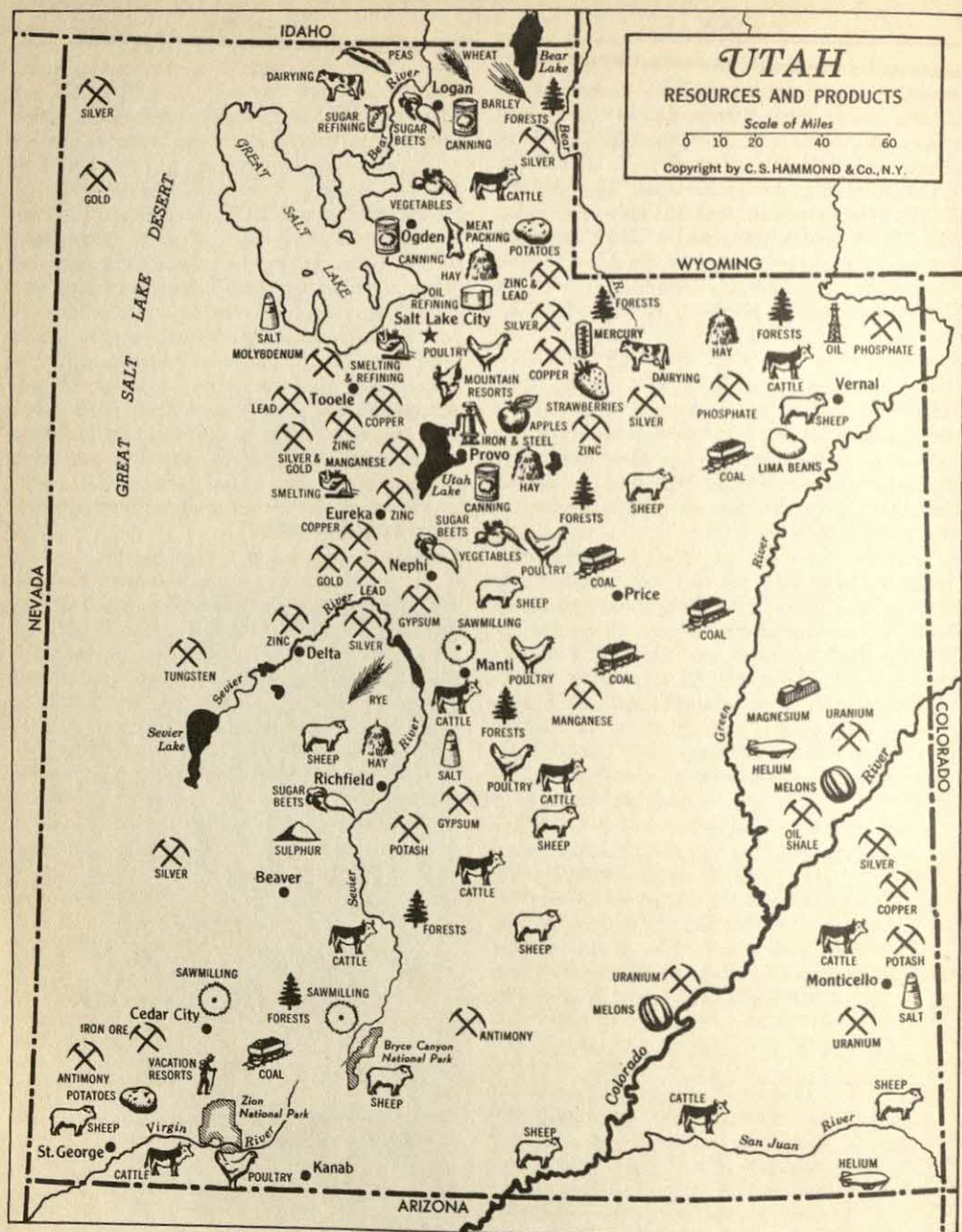
Courtesy Salt Lake City Chamber of Commerce



UTAH'S ECONOMY

Wholesale and retail trade together formed the largest employment sector in the state in 1950, engaging more than 20 per cent of the labor force, which totaled 288,866 persons in that year.

Since the introduction of irrigation by the Mormons in 1848, agriculture has been a prominent factor in the state's economy; in 1950 it engaged almost 13 per cent of the labor force.



The principal farm products are cattle, sheep and lambs, dairy and poultry products, wool, wheat, hay, alfalfa, potatoes, and fruit. Sugar beets are also grown in considerable quantity. Farm acreage totaled 12,262,000 in 1954. In 1956 there were 24,176 farms, with 440 acres the average per farm. The early Mormon system of land allotment provided for many small farms, so that this average includes holdings as small as three acres as well as ranches of many thousands of acres. The 1957 cash income from crops, live-

stock, and government payments was \$159,364,000.

Manufacturing was the third-largest employment sector, accounting for 12 per cent of Utah's workers in 1950. The leading manufactured products are refined beet sugar, wool, petroleum products, refined copper, chemicals, steel, and canned foods. The value added by manufacture in 1957 was \$441,000,000.

Personal income in Utah totaled \$1,442,000,000 in 1957. Wages and disbursements in wholesale

and retail trade made up \$190,000,000 of this amount; in manufacturing, \$178,000,000; and in mining, \$90,000,000. Farming contributed \$15,000,000 in wages and disbursements and \$63,000,000 in proprietors' income.

The state contributed 1.97 per cent of total U.S. mineral output in 1956, valued at \$396,942,000. The principal minerals in order of value are copper, coal, iron ore, and uranium.

Over the last two decades the tourist trade has become increasingly profitable.

TRANSPORTATION AND COMMUNICATION

The earliest transportation in Utah was provided by pack horse and wagon train, along the line later taken by the first transcontinental railroad. The first railroad to enter Utah was the Union Pacific R.R. in 1869; it was met by the Central Pacific R.R., coming from the west, at Promontory, just northwest of Ogden, on May 10, 1869. Other operating lines today are the Western Pacific R.R., the Denver & Rio Grande Western R.R., and the Southern Pacific Lines. Total railroad mileage in 1956 was 1,730 m. In 1957 the state had 31,653 m. of roads, of which 17,114 m. were surfaced. Utah in 1957 had 32 radio stations and four television stations. All the principal cities have airfields. The first newspaper published in the state was the Salt Lake

City *Deseret News* (1850). The leading newspapers today are the Salt Lake City *Deseret News-Telegram* and *Tribune*, the Ogden *Standard-Examiner*, and the Provo *Herald*.

POPULATION

Utah has 29 counties. In 1950 the urban population comprised 65.3 per cent of the total population; the rural population, 34.7 per cent. Between 1940 and 1950, the urban population rose by 35 per cent over that of 1940. The rural population increased by 12.9 per cent. Utah's population was estimated at 865,000 on July 1, 1958. White persons in 1950 numbered 676,909; of these, 647,065 were native born and 29,844 were foreign born. Nonwhite persons in 1950 totaled 11,953; out of this group 4,302 were Negroes, 4,201 were Indians, and the remainder of other groups. Population density in 1950 averaged 8.4 per sq. m.

The major religious faith in 1950 was the Protestant; there was a small Roman Catholic group and a very small Jewish group. The predominant Protestant body was the Church of Jesus Christ of Latter-Day Saints (Mormon). Protestant bodies accounted for almost 70 per cent of the entire population, and Mormons comprised 95 per cent of all Protestants.

Chief Cities: Salt Lake City, in northern Utah,

THE GOOSENECKS OF THE SAN JUAN RIVER

In a 1,200-ft.-deep canyon, in southeastern Utah, the river flows six miles to cover an airline distance of one mile



southeast of Great Salt Lake, is the state capital and largest city; a center of industry, trade, and transportation; and home of the worldwide Mormon Church.

Ogden, *ca.* 33 m. n. of Salt Lake City, is the second-largest city and a railroad, manufacturing, and mining center. Hill Air Force Base is located here.

Provo, *ca.* 45 m. s. of Salt Lake City, is the third-largest city, an industrial center and summer resort, and the seat of Brigham Young Univ. To the east of the city is Provo Peak (11,054 ft.).

Logan, in the extreme northern sector, near the Idaho border, is the fourth-largest city, the center of a farming and cattle-raising area.

Famous Men and Women: Adams, Maude K. (1872-1953), stage star famous for her role as *Peter Pan*.

Benson, Ezra Taft (1899-), a leader of the Mormon Church; Secretary of Agriculture (1953-).

Browning, John Moses (1855-1926), inventor of the Browning machine gun and other automatic weapons.

Dallin, Cyrus E. (1861-1944), sculptor known for numerous Indian statues and for the Pioneer Monument in Salt Lake City.

Jackling, Daniel C. (1869-1956), mining engineer, who proved a practical method of extracting and processing low-grade copper ore.

Young, Brigham (1801-77), spiritual heir of Joseph Smith (founder of Mormonism) and leader of the Mormon pioneer migration to Utah; territorial governor of Utah (1850-57).

Young, Eliza Roxy Snow Smith (1804-87), wife of Joseph Smith and Brigham Young, poet, pioneer Mormon leader.

EDUCATION

Education is free and compulsory for children between the ages of eight and 18. The state's public-school system was established in 1890. Public-school enrollment in 1957 totaled 208,700. The principal state-supported institutions of higher learning are the Univ. of Utah, Salt Lake City; and Utah State Univ., Logan. Private and denominational institutions include Brigham Young Univ., Provo; and the Coll. of St. Mary-

ANNUAL STATE EVENTS

| | |
|-------------------------------|---|
| Civic Oratorio, "The Messiah" | Jan. 1; Tabernacle, Salt Lake City |
| State Livestock Show | First or second week in May; Spanish Fork |
| Roundup | Fourth week in June; Lehi |
| Ute Stampede | Second week in July; Nephi |
| Fiesta Days | Third week in July; Spanish Fork |
| Univ. of Utah Music Festival | Third week in July; Salt Lake City |
| Pioneer Days | Week of July 24; Ogden |
| Days of '47 | Week of July 24; Salt Lake City |
| State Fair | Second and third weeks in September; Salt Lake City |

of-the-Wasatch and Westminster Coll., Salt Lake City.

The Carnegie Library at Ogden has a notable special collection of works on Western U.S. history. Salt Lake City is the primary source for material on the history of Utah and the Mormon Church. Temple Square includes the Mormon Temple itself, the Bureau of Information and Museum, the oldest house in the city (1847), and monuments and statues. The Utah State Art Collection is in the capitol. The Univ. of Utah has an annual summer music festival and a biannual ballet program, and there is an annual symphony series at Salt Lake City.

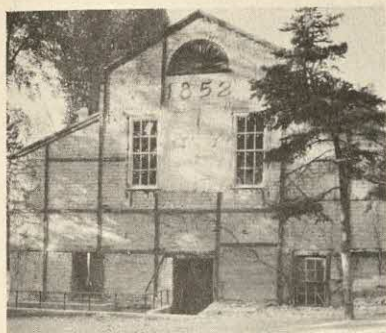
GOVERNMENT

Utah is governed under provisions of a constitution adopted in 1895, the year before its admission as a state, and since amended. The constitution gives executive authority to a governor, secretary of state, attorney general, treasurer, and auditor, all elected for four-year terms. The legislature consists of a senate of 25 members, elected for four-year terms (one-half renewable every two years), and a house of representatives of 64 members, elected biennially. The legislature meets in Salt Lake City, the capital city, on the first Monday in January of the odd-numbered years. There is a state supreme court of five justices, elected for ten-year terms. The state is divided into seven judicial districts, overseen by district judges elected for six-year terms. There are also local justices of the peace. Utah is represented in the U.S. Congress by two Senators and two Representatives.

HISTORY

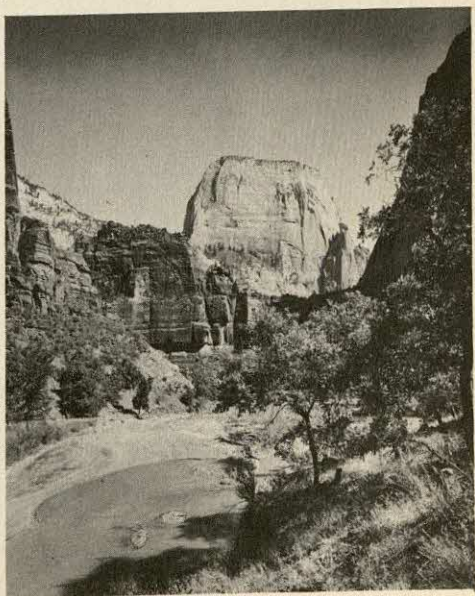
The region now known as the State of Utah was probably first seen by white men *ca.* 1540. A subexpedition sent out by Francisco Vásquez de Coronado, as he explored New Mexico and the northern country for mythical gold-rich cities, touched the Colorado River somewhere in northern Arizona and may have seen some of Utah's high plateaus. But the first actual visit by white men was not until 1776, when a party of Spanish explorers, led by two Franciscan friars, set out from Santa Fe (now New Mexico) to find a route to the coast of California; they are known to have seen Utah Lake. In the winter of 1824-25, trapper and scout James Bridger, while hunting the source of the Bear River, discovered the Great Salt Lake; tasting the water, he thought (briefly) that he had unaccountably come to the Pacific Ocean. In 1843 Gen. John C. Frémont, in company with "Kit" Carson and others, explored the Great Salt Lake.

The history of Utah really begins with the 1847 expedition of Brigham Young and a small



PROMISED LAND IN THE WEST

Brigham Young's mill (above), built in 1852, is preserved at Salt Lake City in memory of the man who led the Mormons west to Utah and guided the settlement through its difficult early years (*courtesy Ewing Galloway, N.Y.*). Dredging for salt (top right) deposited by the Great Salt Lake is an important activity (*courtesy Salt Lake City Chamber of Commerce*), but huge copper mines like Bingham Canyon's (right) have a much greater economic value, making Utah an important mining state (*courtesy Ewing Galloway, N.Y.*). The Sea Gull Monument (below) was erected after gulls ate the crickets which were threatening to destroy crops that the pioneers depended on (*courtesy Salt Lake City Chamber of Commerce*). The Great White Throne (below right) is one of the striking sandstone cliffs carved by the Virgin River and attracting thousands of tourists to Zion National Park (*courtesy Utah Tourist & Publicity Council*)





Courtesy Ewing Galloway, N.Y.

RAINBOW NATURAL BRIDGE

The 309-ft. arch of sandstone is the focal point of a National Monument

MAJOR RECREATIONAL AND HISTORIC FEATURES

| Name and Type | Size and Location | Points of Interest |
|--|---|--|
| Bryce Canyon National Park (established 1923) | 36,010 acres, in southwestern Utah; entrance 22 m. S.E. of Panguitch (U.S. 89; state 12) | Colorful, unique erosion forms: a huge horseshoe-shaped amphitheater containing grotesque, highly colored spires, pinnacles, walls |
| Zion National Park (established 1909) | 143,254 acres, in southwestern Utah; entrance 2 m. N.E. of Springdale (U.S. 89, 91; state 15) | Colorful canyon and mesa scenery; erosion and faulting patterns, making extraordinary shapes and landscapes |
| Arches National Monument (established 1929) | 34,250 acres, in southeastern Utah; entrance 5 m. N.W. of Moab (U.S. 160) | Remarkable erosion shapes in the form of giant arches, windows, pedestals, and pinnacles |
| Capitol Reef National Monument (established 1937) | 39,173 acres, in south central Utah; entrance at Fruita (state 24) | Named for dome-shaped white cap along the Fremont River; 20 m. of sandstone cliffs, highly colored, cut by narrow, high-walled gorges |
| Cedar Breaks National Monument (established 1933) | 6,172 acres, in southwestern Utah; 26 m. S.E. of Cedar City (U.S. 91; state 14, 55) | Huge amphitheater eroded into the variegated Pink Cliffs (Wasatch formation) |
| Dinosaur National Monument (established 1915) | 46,046 acres in Utah; the remainder in Colorado; 7 m. N.E. of Jensen (U.S. 40; state 149) | Striking canyons of the Green and Yampa rivers; fossil remains of dinosaurs and other prehistoric animals |
| Natural Bridges National Monument (established 1908) | 2,650 acres, in southeastern Utah; ca. 70 m. S.W. of Blanding (state 47, 261) | Three natural bridges of sandstone, the highest 222 ft. above the stream bed, with a span of 261 ft. |
| Rainbow Bridge National Monument (established 1910) | 160 acres, near the center of Utah's southern border; reachable by pack trail from Rainbow Lodge, Ariz. | Greatest known natural bridge in the world; a symmetrical arch of salmon-pink sandstone, vaulting like a rainbow 309 ft. above the gorge's bottom |
| Ashley National Forest (established 1908) | 1,313,461 acres, in the northeast (U.S. 30, 40; state 44) | East half of Uinta Mts., highest east-west range in the U.S.; Kings Peak (13,498 ft.); Red Gorge of the Green River (1,500 ft. deep); High Uintas Wilderness Area |
| Cache National Forest (established 1908) | 953,115 acres, in northern Utah; the remainder in Idaho (U.S. 305, 189, 91; state 39) | Bear River and Wasatch Mts.; Minnetonka Cave; Logan and Ogden canyons; Snow Basin and Beaver Mt. winter sports areas |
| Dixie National Forest (established 1905) | 1,936,885 acres, in the southwest (U.S. 89, 91; state 12, 22, 54) | Red Canyon; Panguitch and Navaho lakes; Pine Valley Mts.; Boulder Top Plateau; Table Cliff Point, from which peaks in four states can be seen |
| Fishlake National Forest (established 1899) | 1,526,909 acres, in west central Utah (U.S. 89, 91; state 13, 63) | Beaver Mts.; Thousand Lake Mt. Scenic Area; Fish Lake; Petrified Wood Scenic Area |
| Manti-La Sal National Forest (established 1903) | 1,312,695 acres, in eastern Utah; the remainder in Colorado (U.S. 50, 56, 89, 160; state 10, 29, 31, 46, 95) | Wasatch Plateau; Skyline Road; world's largest aspen trees; Great Basin Forest Research Center; La Sal and Abojo Mts.; uranium mining area |
| Uinta National Forest (established 1897) | 854,615 acres, in the northeast (U.S. 40, 50, 91, 189) | Timpanogos Cave; Alpine Scenic Highway around Mt. Timpanogos; Nebo Scenic Loop Road; near Provo canyons |
| Wasatch National Forest (established 1906) | 920,560 acres, in northeastern Utah; the remainder in Wyoming (U.S. 40, 50, 91, 305, 530; state 35, 65, 152, 168, 210, 239) | Wasatch, Uinta, Stansbury, and Onaqui ranges; Uintas Wilderness Area; Mirror, Granddaddy, and Bridger lakes; Mill Creek and Big Cottonwood canyons; Alta and Brighton skiing areas |



Courtesy Ewing Galloway, N.Y.

"THIS IS THE PLACE" MONUMENT

Built in the Great Salt Lake Valley where Brigham Young chose the site for a city

band of Mormons to find their "promised land." The Mormons, by their doctrines and their vigor in upholding them, had made themselves unpopular in Missouri and Illinois and sought a completely unsettled area in which to establish themselves and their religious beliefs. Brigham Young saw the possibilities of the Wasatch slopes, and at Salt Lake City established a central colony which ultimately sent out innumerable branches. In the colony's first year, a vast swarm of crickets began to devour the crops, but huge flocks of sea gulls appeared and ate the crickets. This intervention of the gulls was regarded as a miracle, commemorated by the Sea Gull Monument in Salt Lake City.

The isolation the Mormons had sought was not to last long. The area was ceded by Mexico to the U.S. by the treaty of Guadalupe Hidalgo in 1848. The settlers then organized a government called the State of Deseret (1849), including the present Utah, Nevada, Arizona, and parts of New Mexico, Colorado, Wyoming, Idaho, Oregon, and California. (*Deseret* is a word from the Book of Mormon, translated as "the land of the honey bee.") Deseret was admitted to the U.S. as the Territory of Utah (Sept. 9, 1850), with Brigham Young as governor and commissioner of Indian affairs. Just as settlement and organization were getting well under way, the 1849 California gold rush broke out; Utah was in the direct path of overland travel. The Mormons were discouraged by their leaders from engaging in the mining of precious metals, but they profited from the gold rush by

selling food and supplies. Inevitably, conflicts arose, especially after the discovery of the Comstock Lode in the western part of the territory (now Nevada). Nevada became a territory and Colorado was carved off in 1861; Utah assumed its present boundaries in 1868 with the loss of its northeast corner to Wyoming. There were several Indian outbreaks from 1853 onward, but these were effectively ended by 1867. Requests for statehood were repeatedly rejected by the U.S. Congress because of public reaction to the then prevalent Mormon doctrine on polygamy, as well as sharp conflicts of interest between Mormons and non-Mormons and between the territorial and Federal governments. Utah finally became a state on Jan. 4, 1896, after the Mormon Church had in 1890 renounced polygamy.

Meanwhile Eastern capital had moved in and local capital had increased, turning the state slowly away from the simple, pious, agricultural economy envisioned by Brigham Young and into the manufacturing-mining-agricultural-mercantile economy of today.

The history of Utah since statehood has closely paralleled that of its neighbor states in the intermountain area, both politically and economically. Utah provided 21,392 residents to the armed forces in World War I. In World War II the state was represented in the armed forces by 77,359 men and women.

Although the state has valuable agricultural and manufacturing resources, perhaps its greatest potential lies in the virtually undeveloped mining of nonmetals, especially mineral salts;

UTAH LAKE

petroleum and uranium have recently been discovered. Pipelines are already carrying oil and natural gas from Utah to the Pacific Northwest and to the heavily industrialized markets of Los Angeles.

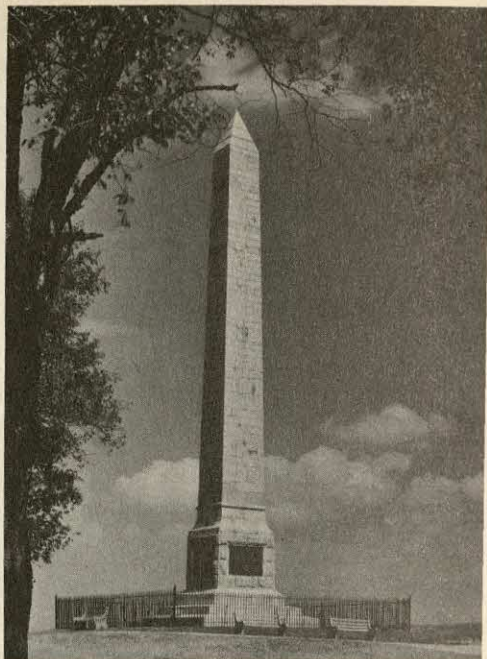
See also separate entries on most of the individuals and geographical and historical subjects mentioned in this article.

Utah Lake, the largest fresh-water lake of Utah, in Utah County, 30 m. s. of Salt Lake City. It is *ca.* 23 m. long, *ca.* 8 m. wide, and has an area of *ca.* 150 sq. m. Its chief tributaries are Spanish Fork and Provo River, and its outlet is into Great Salt Lake by the Jordan River. Provo and several other towns are on its shores. The lake's waters, harnessed by the Provo River Project, are used primarily for irrigation. Utah Lake (as well as Great Salt Lake and Sevier Lake) is a remnant of prehistoric Lake Bonneville.

Utah, UNIVERSITY OF, a coeducational state institution of higher learning at Salt Lake City, Utah, founded in 1850 and opened under its present name in 1890. It maintains courses in education, engineering, finance and commerce, fine arts, law, letters and sciences, medicine, mining, nursing, and pharmacy. There is a graduate school and a graduate school of social work. The George Thomas Library has more than 679,000 volumes and documents. The annual student enrollment totals *ca.* 10,000, and the faculty has some 575 members. The physical plant is valued at \$30,000,000.

Ute (*üt*), sometimes called EUTAH or UTAH, a member of an important Indian tribe or confederacy of the Shoshonean linguistic stock. They formerly ranged over central and western Colorado, eastern Utah and the northern edge of New Mexico. They were hunters, both of game and weaker peoples. They early came into possession of horses, which intensified their aggressive character. The various bands which formed the confederated group were united under Chief Ouray in the late 1860's. Their transition to sedentary life has been slow and definitely not at all of their own volition. The younger Utes are making some progress in industrial and educational arts, but the older people are mainly dependent on the government for their support. In 1950 there were 2,050 Utes living on four reservations in Utah and two in Colorado.

Uterus (*üt'er-üs*), the organ in the female mammal which receives and holds the ovum. In its pear-shaped hollow the embryo develops. It is the main agent in its expulsion during the act of birth. In human beings this muscular organ is about 3 in. long, 2 in. wide, and 1 in. thick. The whole organ is contained within the pelvis. See also *Birth*.



Courtesy Utica Chamber of Commerce

UTICA, N.Y. ORISKANY BATTLEFIELD

Site of a Revolutionary War engagement

Utica (*ü'ti-ka*), a city in New York, seat of Oneida County, on the Mohawk River, 46 m. E. of Syracuse. It is served by the New York Central and the Delaware, Lackawanna & Western R.R.'s. The State Barge Canal has a terminal in Utica. Oneida County Airport is 8 m. from the city limits.

Situated in a farming and dairying region, Utica is an industrial and distribution center, with manufactures of textiles, radios, military electronics, pneumatic and other tools, and apparel. It is part of the Utica-Rome standard metropolitan area (2,669 sq. m.; pop., 1950, 284,262), which in 1954 had a value added by manufacture of \$328,206,000; the figure for the city alone was \$122,648,000.

Utica's *ca.* 35 public and parochial elementary and secondary schools enroll *ca.* 20,500 pupils annually. Institutions of higher learning include Utica Coll., a branch of Syracuse Univ.; Mohawk Valley Technical Inst.; the Utica Conservatory of Music and School of Languages; and the Munson-Williams-Proctor Inst. School of Art. Among cultural facilities are choral and symphonic societies. Utica's park system of more than 800 acres includes Roscoe Conkling Park, with a zoo. The city is at the gateway of the Adirondack Mt. resorts, within easy reach of Adirondack State Park. Oriskany Battlefield and the burial place of Baron von Steuben (*q.v.*) are nearby.

The city is on the site of Ft. Schuyler, built

by the British in 1758. The fort was abandoned in the 1760's and settlement began in 1773. Utica was incorporated as a village in 1798 and as a city in 1832. In 1900 the population was 56,383. Between 1910 and 1920 it grew from 74,419 to 94,156. Population, 1960, 100,410.

Utica, an ancient city of Africa, ca. 15 m. n.w. of Carthage, near the modern city of Tunis. It is thought to have been founded by the Phoenicians about 1101 B.C., and it grew rapidly in commercial importance. In alliance with Carthage, Utica defended itself against the Roman invasions until the Third Punic War, when it surrendered. It was made capital of the Roman province of Africa and was the empire's principal commercial city until Caesar rebuilt Carthage in 44 B.C. With the decline of Rome, Utica fell successively to the Vandals, the Byzantines, and—in the 8th century—the Arabs, who destroyed it. Its Roman ruins include an amphitheater seating 20,000, baths, and an artificial lake. It is believed to be the city where Cato killed himself.

Utilitarianism (*û-tîl'i-târ'i-an-iz'm*), a philosophical doctrine which holds that the principle of utility is the leading consideration and at the same time the right form of action, if and when it produces the greatest possible pleasure or happiness for mankind. This theory would make it always simple to find the right way of action. The opposite idea believes that the decision about right or wrong depends on absolute values which are recognizable through innate moral distinctions, conscience, etc. Originally formulated by Jeremy Bentham, and later by John Stuart Mill, utilitarianism was popularized by Herbert Spencer (*q.q.v.*), who connected this concept with his ideas about evolution (*q.v.*) in terms of matter, motion, and force. Thus, a strict form of individualism (*q.v.*) can be motivated through the utilitarian attitude. To a certain degree, Greek philosophical writers and even the English philosopher John Locke (*q.v.*) had played already with similar ideas. In the U.S. the pragmatism of William James and John Dewey (*q.q.v.*) followed similar ideas in its ethical concepts.

Utility (*û-tîl'i-tî*), PUBLIC, any business enterprise which the courts maintain to be "affected with a public interest." The businesses of supplying gas, electricity, water, and transportation to a community are regarded as public utilities. Government control over public utilities, particularly in the U.S., has tended toward increase in recent years. The Public Utility Holding Co. Act of 1935, administered by the Securities and Exchange Commission (S.E.C.), purposes to eliminate abuses and increase the protection of investors, consumers, and the public in regard to public utility holding company finances and

operation. See also *Holding Company*; *Tennessee Valley Authority*; *Trusts*.

Utopia (*û-tô-pî-a*), a word invented, from Greek roots, by Sir Thomas More, meaning "Nowhere," used as the title of his book (1516) in which he described an imaginary island (located somewhere south of Australia) where everything was perfect—laws, morals, economy, and behavior. This book had somewhat more influence than is generally realized upon the concepts behind the American and the French Revolutions. The word has come to be applied to any imaginary state wherein an author or political theorist supposes things vastly improved over the way they are in real life and in his own time and place.

Utopias have appeared in the literatures of many countries. For example, Plato's "Republic" and "Laws" (4th century B.C.), and Plutarch's "Life of Lycurgus" (1st century A.D.)—which latter contains a picture of the idealized Spartan state—describe for the ancient Greeks what life could be if men lived "rationally." Other Utopias

UTOPIA

A Holbein wood engraving for Sir Thomas More's book describing the ideal state



in literature are Bacon's "New Atlantis" (1628), Campanella's "City of the Sun" (1623), Swift's "Voyage to Brobdingnag" (1726), Bellamy's "Looking Backward" (1888), and H. G. Wells' "A Modern Utopia" (1905). (Wells' works are filled with scattered Utopian visions; cf. especially "In the Days of the Comet" and "The World Set Free.") Two recent Utopias—better called pseudo-Utopias, because treated satirically—are Aldous Huxley's "Brave New World" (1932), and Eugene Zamiatin's "We" (ca. 1923).

It is interesting to note that all these dreams of a perfect land outline the same general conditions, though written in different languages and centuries apart. All provide for peace, and intelligent self-discipline, for no extremes of poverty or wealth, for equal justice for all men, for religious tolerance and liberty of thought and speech. All describe some form of collectivist state, and in all the people are, theoretically, happy.

Various attempts have been made to found Utopian communities (cf. Lewis Mumford's "Story of Utopias"), most commonly in the U.S. in the 19th century. The colonies of Brook Farm, Mass., New Harmony, Ind., Icaria, Iowa, the Oneida Community, have all been such ventures. The French Revolution (1789) and the Russian Revolution (1917) were both, ostensibly, attempts to found nationwide Utopian societies.

Utrecht (*ūtrēkt*), a city in The Netherlands, capital of the Province of Utrecht (area, 535 sq. m.; pop., 1957, 650,304), on the lower Rhine River, 20 m. s.e. of Amsterdam. It is the market for the surrounding agricultural region and an important industrial center, with railroad shops and manufactures of chemicals, instruments, building materials, machinery, and glass, metal, leather, and tobacco products. Notable buildings include the Cathedral of St. Martin and the Univ. of Utrecht (founded in 1636). Utrecht was known to the Romans. The bishopric of St. Willibrord (q.v.), established here ca. 695, is essentially the present province. The city was the seat of the Dutch States-General for some time after the formation (1579) of the Union of Utrecht, and the treaties of Utrecht were signed here in 1713-14 (see *Spanish Succession, War of the*). During World War II, Utrecht was occupied by German forces and suffered heavy damage from bombing; it was liberated by the Allies in May 1945. Population, 1958, 249,324.

Utrillo (*ōō-trē'lō*), MAURICE, artist, born in Paris, France, Dec. 26, 1883; died in Dax, Nov. 5, 1955. Son of an artists' model and artist, Suzanne Valadon, and an unknown father, Utrillo spent a deeply disturbed childhood and by the age of 18 was a confirmed alcoholic. The name Utrillo was offered to him by the Spanish critic and painter, Miguel Utrillo. He took up

painting in 1902 as a form of therapy. From 1908 to 1914—his "white period"—he produced some of his greatest works, lonely scenes of Parisian streets and suburbs. For the last 20 years of his life he was kept in strict seclusion, in Angoulême, and later in a villa outside Paris.

Uttar Pradesh (*ōō'tēr prā-dāsh'*), a state of India, with an area of 113,423 sq. m. The northern part of the region lies in the Himalaya; the southern (greater) part comprises the plains of the Ganges and Jumna rivers. Its extraordinarily fertile soil produces wheat, rice, millet, cotton, and sugar. Almost three-quarters of the population engages in agriculture. Historically, the region was the heart of Indian development and the center of Asoka's empire (see *Asoka; India; History*). Under British rule the provinces of Agra and Oudh were created; in 1877 these were combined, and in 1902 they were constituted the United Provinces of Agra and Oudh. Since 1937 there has been an autonomous system of government, with a two-chamber legislature. In 1950 the province became a state, under the name of Uttar Pradesh. The capital and second-largest city is Lucknow (pop., 1951, 496,861). The largest city is Cawnpore, and other major cities include Agra and Allahabad. Population, 1951, 63,215,742.

Uz (*ūz*), in the Old Testament, a region east of Palestine, where Job underwent his afflictions and where he was visited by his four friends, Eliphaz the Temanite, Bildad, Zophar, and Elihu (Job 1:1; 2:11).

Uzbek Soviet Socialist Republic (*ōōz'bēk*) or **UZBEKISTAN**, a constituent republic of the Union of Soviet Socialist Republics, in central Asia, with an area of 146,000 sq. m. It lies in the valley of the Amu Darya, north of Afghanistan. Uzbekistan, irrigated by canals, is an important agricultural region. The chief center of cotton production in the U.S.S.R., it also produces rice, livestock, silk, grapes, and fruits. Mineral deposits include coal, oil, and copper. Among the leading industries are hydroelectric plants and the manufacture of textiles, steel, chemicals, farm machinery, paper, and cement. Uzbeks comprise nearly three-quarters of the population; the remainder includes Russians, Ukrainians, Tadzhiks, Kazakhs, Kirghiz, and Karakalpaks, the last-named being organized as an autonomous republic within Uzbekistan.

Originally settled by Moslems of Turkish origin, the region was overrun by Genghis Khan in the 13th century and by Timur in the 14th century. It was taken over by Russia between 1865 and 1873; the republic was formed in December 1924 from parts of Turkestan, Bokhara, and Khorezm. The capital is Tashkent (pop., 1956, est., 778,000), which succeeded Samarkand in 1930. Population, 1956 (est.), 7,300,000.



V (*vē*), the 15th consonant and the 22d letter of the English alphabet. The letter was derived from the Phoenician through the Greek and the Roman languages, corresponding to the Roman V. It represents a labial or labio-dental consonant sound and is formed by the junction of the upper teeth and the lower lip, as in *ov*, *eve*, and *vain*. The sound of *v* is produced in the same way as that of *f*, but differs from the latter in being voiced, while the sound of *f* is breathed. As a Roman numeral *V* is used to denote the same value as the Arabic 5 and when a dash is placed above it, as *V*, it represents 5,000.

Vaccination (*vāk-sī-nā'shūn*), the art of introducing vaccine matter into the human system with the view of providing protection against smallpox, or to render that disease less severe. The vaccine matter generally used is the so-called vaccine virus, obtained from pustular eruptions on the skin of the teats and udders of cows having cowpox, an acute contagious disease. The common method is to cut the skin slightly with a clean lancet point, usually on the upper part of the arm, and then rub the vaccine matter over the skin containing the scratches. Vaccination pustules formed on another person answer the same purpose. Where the vaccination proves successful, inflamed pustules form on the third day. Loss of appetite and slight headaches usually occur the eighth day, and the inflammation begins to decrease the tenth day. A scab forms after the pustules are dried up, which usually disappears the 20th day and leave a slight scar. Dr. Edward Jenner (1749-1823) of England was the discoverer of vaccination.

Widespread vaccination at least greatly lessens the severity of the disease. Public health decrees of most countries including the U.S. request

that a child be vaccinated at about the sixth month after birth and that subsequent vaccinations be made at an interval of six or seven years. Children are refused admission to the public schools in some countries unless they are previously vaccinated. Until about 1900, smallpox was epidemic in many countries. When it was proved quite conclusively that the disease was most general in sections where vaccination had decreased, the health authorities of most cities in the U.S. ordered general vaccination.

Protective inoculation against other diseases, though the inoculatory material is derived from a horse, a sheep, or some other animal, instead of from a cow, also is known as *vaccination*. This form of treatment is now applied extensively as a means of protection against diphtheria, typhoid fever, scarlet fever, and other diseases. See also *Serum Therapy*.

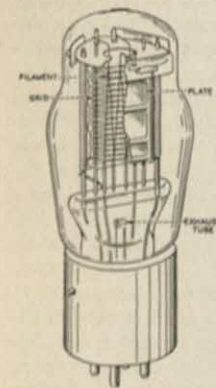
Vacuum (*vāk'ū-ūm*), strictly, a space devoid of any material; practically, a space from which air or other gas has been partially removed. The remaining gas is described in terms of its partial pressure. Atmospheric pressure is 760 mm. Hg at sea level; pressure as low as 0.000002 mm. has been attained. "High vacuum" refers to a pressure of about 0.01 mm., low vacuum to 50 to 1 mm.

Vacuum Tube (*vāk'ū-ūm tūb*), an electrical device consisting of an evacuated glass or metal envelope into which several electrodes have been sealed. It is also referred to as a *thermionic tube* or *valve*. These are classified according to the number of electrodes they contain, being called *diodes*, *triodes*, *tetrodes*, or *pentodes* when the number of electrodes is 2, 3, 4, or 5. At least one electrode in each tube is a cathode emitting electrons as a result of being heated. This may be a

filament similar to the filament of the incandescent lamp or it may be a sleeve cathode heated indirectly by a separate heating coil. The cathode at a temperature of approximately 2000 C. emits electrons, which may be drawn to an anode, or plate, at a high positive potential with respect to the cathode. The electron current within the tube varies with the cathode temperature and the anode potential. The diode tube may be used for alternating-current rectification, since the passage of electrons within the tube may occur in only one direction. It is also used in radio detection, where the requirement is also production of unidirectional flow.

The third electrode in the tube is a grid interposed between cathode and anode. It serves to control the electron flow in the tube by application of a potential below the cathode potential. Thus by applying a small change of potential in the grid circuit a large change of plate current may be effected in the plate circuit, resulting in a correspondingly large change of plate potential. In proper circuits the triode may be made to produce amplification of weak voltages. It may also be made to produce oscillatory currents for radio transmitters and to modulate those currents with speech waves. The triode vacuum tube is responsible for radio broadcasting as it exists today.

The accompanying picture shows a glass-enclosed triode used for amplification of speech currents. The V-shaped filament occupies the center of the tube and is surrounded by the grid and plate, which are here cut away to show the other parts. All leads to the electrodes are connected to the pins at the base of the tube through a glass seal which holds the electrodes in place. The tube for evacuating the



VACUUM TUBE

glass envelope also enters the tube through the bottom.

In the tetrode and pentode tubes additional grids are introduced which control the flow of electrons more effectively than does the single grid. In many tubes a dual purpose is served by using two anodes and several grids with resultant economy of cost and space.

The first vacuum tube was built as an indicator of high-frequency oscillations by Zehnder in Germany in 1892. In 1905, J. A. Fleming in England constructed a diode for detecting radio waves. Two years later Lee De Forest (*q.v.*) in the U.S. invented the modern three-electrode vacuum

tube containing the control grid. The invention of this tube, by increasing amplification, made possible radio telephony and the long-distance telephone. Thomas A. Edison (1847-1931) missed the honor of inventing the triode in 1884, when he proposed the use of an incandescent lamp with an additional electrode for controlling the voltage fluctuation of a dynamo. This apparatus was not perfected and its control feature remained unused until De Forest brought it to light. See also *Radio*.

Vagina (*vá-jí-ná*), in anatomy, a canal which connects the external with the internal sexual, generative organs in the female body, extending from the vulva, the external sexual organ, to the uterus (*q.v.*).

Vagus Nerve (*vá'gūs nērv*), in anatomy, that part of the nervous system which reacts to sensation and motion. Upon stimulation it causes slowing of the heart action, increasing the movements of the intestines.

Valdai Hills (*vál-dí' hílz*), an elevated region of hills in western Russia, about 125 m. s.e. of Leningrad. Within these highlands are the sources of the Volga, Duna, and Dnieper Rivers. The general elevation is about 310 ft. above sea level, but some mountains rise over 1,000 ft. Immediately west is Lake Ilmen. The region is well wooded and watered. The valleys and lower slopes are agricultural.

Valdez (*vál'dēz*), a port on Prince William Sound, Alaska, 300 m. s. of Fairbanks. It is the coast terminus of the Richardson Highway, and serves as a supply center for the gold mining region to the north, having both an airport and seaplane base. Population, 529.

Valdivia (*vál-dē'vyá*), a city of Chile, capital of a province of the same name (area, 7,721 sq. m.; pop., ca. 200,000), near the mouth of the Calla-Calla River. It has a well-sheltered harbor at Port Valdivia, on the Pacific coast, about 16 m. e., and is connected with interior points by railways. The province is rich in natural forests and the city has a large export trade in hides, lumber, cattle, and minerals. The place was founded by Pedro de Valdivia in 1551. Population, ca. 35,000.

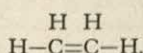
Valdosta (*vál-dōs'tá*), county seat of Lowndes County, Ga., in the southern part of the state, on the Southern, the Atlantic Coast Line, and the Georgia & Florida R.R.'s. The surrounding country produces sugar cane, corn, tobacco, pecans, cotton, and vegetables. The manufactures include cigars, turpentine, fertilizer, veneer and plywood. Valdosta is the seat of Valdosta State Coll., which has a student enrollment of about 350. The place was settled in 1859 and incorporated in 1860. Population, 1900, 5,613; in 1940, 15,595; in 1950, 20,046.

Valence (*vál'ēns*), from a Latin expression meaning "to have power." In *physics*, a number indicating the capacity of an atom or radical (a

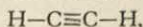
group of atoms chemically bound to one another acting as a unit and bearing an electrical charge) to hold other atoms or radicals. Valence is of at least two distinctly different forms: electrovalence and covalence.

In *electrovalence* the atoms are really present as ions (electrically charged atoms) and are held to one another by means of the force of electrical attraction of opposite charges. The valence of a positively charged ion is expressed in terms of the number of chloride ions that will be required to neutralize exactly the charge on the ion. For example, sodium ion (Na^+) has a charge of $+1$, magnesium ion (Mg^{++}) a charge of $+2$, aluminum ion (Al^{+++}) a charge of $+3$, and zirconium ion (Zr^{++}) a charge of $+4$. These ions require 1, 2, 3, and 4 chloride ions respectively to become completely neutralized and the valences, specifically the electrovalences, of this series of ions are $+1$, $+2$, $+3$, and $+4$ respectively. The electrovalences of negatively charged ions are expressed in terms of the number of protons necessary to neutralize completely the charge on the negative ion. Thus the electrovalences of chloride (Cl^-), sulfate (SO_4^{--}), and phosphate (PO_4^{--}) are -1 , -2 , and -3 respectively, since one, two, and three hydrogen ions (protons) are held when these ions are neutralized as in HCl , H_2SO_4 and H_3PO_4 .

Covalence indicates a sharing of electrons and an absence of electrical charges. According to the electronic theory of valency, a stable configuration of electrons for a large number of atoms is a structure consisting of eight electrons. Hydrogen is an exception, requiring only two electrons. These electrons may be shared between two atoms, thus contributing to the stability of the configuration around each atom. One pair of electrons shared between two atoms constitutes one covalent bond, four pairs represent two covalent bonds, and so on. For example, in hydrogen chloride the hydrogen is held to the chlorine by sharing one pair of electrons. This gives each atom a stable electronic configuration and both the hydrogen and chlorine are said to have a covalence of 1. An example of an atom having two covalent bonds between two atoms is carbon in the ethylene (C_2H_4) molecule. If we let a straight line represent a pair of electrons the graphic formula is



For acetylene the corresponding structure is



indicating that carbon in this compound has three covalent bonds between the two atoms. In all these cases the covalence of carbon is four, hydrogen one. Covalence may be either coordi-

nate covalence or dative covalence depending upon whether one atom furnishes *both* electrons, as in the ammonium ion where the nitrogen from the ammonia supplies both electrons, or each atom contributes to the pair as in hydrogen chloride in which the hydrogen atom contributes one electron and the chlorine atom furnishes the other.

Some substances may show both electrovalence and covalence. An example is tetra-amminocupric sulfate, $\text{Cu}(\text{NH}_3)_4^+ \text{SO}_4^-$. In this compound the cupric ion (Cu^{++}) shares four pairs of electrons, building up a stable electronic configuration around itself without influencing its electrovalence of $+2$ at all. This substance is a blue crystalline solid at room temperature. In general the presence of electrovalence in a compound gives its solid form crystalline properties (aggregates of ions orderly arranged in a hard structure), while covalence occurs in molecular substances such as water, wax, oils, etc., whose solid forms are relatively soft.

Valencia (*vā-lēn'shī-ā*), a seaport city of Spain, on the Mediterranean Sea, about 200 m. s.e. of Madrid. It occupies a convenient site on the Guadalquivir (Turia) River and has good railroad facilities. A broad quay, improved by avenues of trees, is located along the river. An avenue called the Alameda passes from the quay to the harbor on the Mediterranean. The city is surrounded by orchards and vineyards. Among the chief buildings is La Seo Cathedral, a Gothic structure of the 13th century, and near it are a number of chapels. Other buildings of note include the university, custom house, and several secondary schools. Valencia is noted for its manufacture of tobacco products. Other manufactures include glass, leather, linens, silk and cotton textiles, pottery, soap, machinery, clothing, ironware, and musical instruments. It has a large interior and foreign trade in silk, spirits, cereals, and fruits. The fine climate and convenient transportation facilities make it a favorite summer resort. Valencia was a Roman city, but subsequently became a center of Gothic influence, and in 713 was captured by the Moors. In 1812 it surrendered to the French. The province of Valencia has an area of 5,925 sq. m. and a population of over 1,200,000. City population, *ca.* 475,000.

Valencia (*vā-lēn'syū*), a city of Venezuela and capital of Carabobo, 30 m. s. of the Caribbean Sea and about 82 m. s.w. of Caracas. It has railroad connections with Puerto Cabello and is situated in a fertile farming and stock-raising region. About eight miles east of it is Lake Valencia. The manufactures include cotton and woolen goods, pottery, machinery, cordage, tobacco products, and farming implements. Among the noteworthy architectural structures are the university, several schools and churches, and gov-



Courtesy Grace Line

CARABOBO MONUMENT IN VALENCIA, VENEZUELA

ernment buildings. It was founded by the Spanish in 1555. Population, *ca.* 50,000.

Valens (*vāl'lēns*), FLAVIUS, Roman Emperor of the East, born in Pannonia about 328; slain near Adrianople, Aug. 9, A.D. 378. His brother, Valentinian I, proclaimed him Emperor of the East in 364, and he received as his share of the Roman dominions all of Thrace, Egypt, and Asia. Valens greatly reduced taxation in his lands, and successfully defended them against the Visigoths under Athanaric. A peace was concluded in 369, and when the Huns drove the Visigoths (under Athanaric's rival, Fritigern, an Arian Christian) southward, in 377, the latter were permitted to settle in Moesia, which was a part of the Roman territory. Subsequent oppression of the Visigoths by Roman officials, however, caused a revolt and the decisive battle of Adrianople. The Roman army was cut to pieces by the Visigothic forces and Valens was slain.

Valentine (*vāl'en-tīn*), or VALENTINUS, the name of three saints who were martyred. The Valentine whose feast is celebrated on Feb. 14 was probably a priest who ministered to Christian martyrs in Rome during Roman persecutions, and was himself martyred on a Feb. 14 in the second part of the 3rd century. The association of the lovers' festival with him seems to be purely accidental. Valentinus was also the name of a Gnostic (see *Gnosticism*) Roman philosopher who lived in the 2nd century.

Valentinian I (*vāl'en-tīn'i-an*), FLAVIUS, Roman Emperor of the West, born in Pannonia in A.D. 321; died there Nov. 17, 375. A military leader of great courage and capacity, he was banished by the emperor Julian in 362 because of his contempt for paganism. Restored to favor in the following year, he was given command of an army in the East, where he distinguished himself highly. On the death of Jovian in 364, Valentinian was chosen emperor by the army stationed at Nicæa.

VALERA

One of his first important acts was to name his brother Valens as Emperor of the East, while he governed Italy, Spain, Gaul, Germany, and North-western Africa. During his reign of 11 years he encouraged industries and reformed the civil service. During this period, the Western empire was invaded by a number of Germanic tribes. His daughter, Galla, became the wife of Theodosius I and his two sons, Valentinian and Gratianus, succeeded him in the government.

Valentinian II, FLAVIUS, Roman Emperor of the West, born in 371; died in 392. He was only four years old when his father, Valentinian I, died, while his elder brother Gratianus was seventeen. The two succeeded their father in the government, with their residence at Milan. Gratianus retained Britain, Gaul, and Spain; Valentinian, with the assistance of his mother Justina, ruled Italy, and parts of Africa and Illyricum. Gratianus was assassinated by Maximus in 383, and his army in Britain rallied to the latter's support. Maximus invaded Italy in 387, forcing Valentinian and Justina to flee to Thessalonica and to request the protection of Theodosius, Emperor of the East and Valentinian's brother-in-law. Theodosius sent a large army into Italy which defeated Maximus and restored Valentinian to the throne. Four years later, Valentinian was slain by Arbogastes, a Frankish commander in his army. See also *Gratian*.

Valentinian III, PLACIDIUS, Roman Emperor of the West, born in 419; slain March 16, 455. He was the son of Constantius III and of Placidia, the daughter of Theodosius and Galla, and in 425 was declared Emperor of the West by Theodosius II. In the first part of his reign he was assisted by his mother. His government of 30 years was both weak and corrupt, and witnessed a rapid decadence of Roman power. In this period occurred the great barbarian invasions under Attila and Genseric (or Gaiseric), which were held back for some years by the Roman general Aëtius. The Vandals under Genseric conquered Africa, but Attila finally was defeated by Aëtius. Valentinian was so jealous of Aëtius that he killed him in 454. Friends of Aëtius joined Maximus in opposition to Valentinian, and assassinated him while he was attending games in the Campus Martius. Valentinian was the last of the family of Theodosius.

Valentinus (*vāl'en-tī-nūs*), Gnostic philosopher. Little is known of his life, but it is certain that he was born in Egypt and quite probably received his education in Alexandria. He came to Rome about 138, where he lived in the time of Pius (140-155), and was a contemporary of Anicetus (155-166). Valentinus' speculations have become known as *Valentinianism*; they were of great influence on the early churchmen and particularly upon Origen (*q.v.*). He later resided at Cyprus where he died about A.D. 160. See also *Gnosticism*.

Valera (*vā-lā'rā*), EAMON DE. See *De Valera*.

Valerian (*và-lè'ri-àn*), a genus (*Valeriana*) in the family *Valerianaceae* of plants native to temperate regions, many of which are cultivated in all the continents. About 260 species have been described, including both annual and perennial plants, mostly herbs and shrubs. Some of the species are good border plants for the garden, particularly *V. officinalis*, which has broad, lance-shaped leaves, and pink, white, or lavender, fragrant flowers. It grows from 2 to 5 ft. tall, and is also known as the garden heliotrope. Most of these species have fleshy roots, woody fibers, and yield gummy and resinous substances. Several of the species are valuable for a substance used in medicine; it is derived from the root as a volatile oil, known as *oil of valerian*.

Valéry (*và-là-ré'*), PAUL, poet, born in Sète, France, Oct. 30, 1871; died in Paris, July 20, 1945. He was a disciple of Mallarmé (*q.v.*). His first writings, in the last decade of the 19th century, attracted no attention; he therefore retired from literary effort for nearly 20 years and devoted himself to mathematics and science. André Gide (*q.v.*) discovered Valéry's 1917 poem, "*La Jeune Parque*" ("The Young Parca," i.e., Fate), and helped to make the reputation of Valéry, who published in rapid succession several small volumes of verse: "*Odes*," "*Album des vers anciens*" ("An Album of Old Verses"), "*Le Cimetière Marin*" ("The Graveyard by the Sea"), and "*Charmes*." His Socratic dialogue, "*Eupalinos ou l'architecte*" ("Eupalinos, or The Architect," 1923), and two volumes of beautiful essays, "*Variété*" ("Variety," 1924, 1929), rounded out the earlier prose expression of his ideals found in "*Une Soirée chez M. Teste*" ("An Evening-Conversation with M. Teste," 1896) and in his "*Introduction à la méthode de Léonard de Vinci*" ("Introduction to the Method of Leonardo da Vinci," 1895), in praise of his "prince of intellectuals." "*Mon Faust*" (My Faust), which finds even the devil incapable of adapting himself to the modern world, was published posthumously. Considered the foremost modern French poet, he was made a member of the French Academy.

In "*Variété*" he launched the expression "*poésie pure*," poetry that should "eliminate life" in favor of a mathematically metaphysical conception. Like Mallarmé, he symbolizes abstract themes by giving a "purer meaning" to ordinary words. His lines are musical and original, but his "mathematical obscurity" makes him frequently hard to understand. To the uninitiated he seems colorless and cold despite his fine images. It is usually only after many readings that one comes to enjoy his compact power, his love of thought, his distrust of spontaneity, and his genuine classical beauty of expression. He is a bold, sensuous, subtle spirit who produces the cold exactness of an equation for the reader to ponder, in an age when other

writers, such as Duhamel and Romain, (*qq.v.*) and Albert Camus, prefer clarified simplicity in the old classical tradition. Valéry was also greatly interested in music and architecture.

Valhalla (*vâl-hâl'lâ*), or WALHALLA, in Scandinavian legends, the residence of Odin (*q.v.*), and the palace in which the souls of those fallen in battle had their habitation and spent their time in joyous feasting. It was supposed that the heroes, when aroused by the crowing of the cock in the morning, went out to fight one another until noon. At that time all wounds were healed and the heroes were permitted to banquet with Odin.

Ludwig I of Bavaria erected a magnificent temple on the Danube, near Ratisbon, in 1830-42, as a pantheon to the German people. This temple became known as Valhalla, since the idea for its erection was derived from the Valhalla of the ancient Scandinavian legends.

Valkyries (*vâl-kîr'ez*), in Scandinavian mythology, the maidens who attended upon Odin, by whom they were sent to the field of battle to choose those who were to be slain. The Valkyries were mounted on horses and armed with helmets and spears. They bore the souls of the brave to Valhalla, to serve as an army for Odin in his inevitable fight against the giants. The number of these maidens is usually stated to have been nine, although more are named in the "Elder Edda." See also *Saga*.

Valladolid (*vâl-yâ-THô-lêTH'*), a city in Spain, capital of the province of Valladolid (area, 3,155 sq. m.; population, ca. 350,000), 98 m. N.W. of Madrid. It is situated on the Pisuerga River, a tributary of the Douro. The climate is mild and healthful. Surrounding the city is a region famed for its abundance of livestock, cereal crops, and vegetables. The noted buildings include a 16th-century cathedral and the 12th-century church of Santa María la Antigua.

PAUL VALÉRY

Courtesy French Press and Information Service, N. Y.



Valladolid is noted as an industrial center. Among the principal manufactures are silk and cotton textiles, paper, jewelry, woolens, perfumery, pottery, clothing, and machinery. It has a large trade in livestock and grain, considerable quantities being transported by railway and by boats on the Douro. Valladolid was known as *Pincia* in the time of the Romans. The Moors called it *Belad-Walid*, and after their expulsion it was occupied by Ordonez II of Leon. Charles V improved it by constructing many beautiful buildings and palaces. It began to decline in 1560, when Madrid became the residence of the Spanish sovereigns. It still maintains a university, an institution that has flourished for eight centuries. Population, *ca.* 125,000.

Vallandigham (*vāl-ān'dī-gam*), CLEMENT LAIRD, politician, born at New Lisbon, O., July 29, 1820; died at Lebanon, O., June 17, 1871. He attended the New Lisbon Acad. and Jefferson Coll., Pennsylvania, taught school at Snow Hill, Md., and in 1842 was admitted to the bar in Ohio. In 1845, he was elected to the state legislature and was chosen a member of Congress as a Democrat in 1858. While in that body he became known as an extreme advocate of state rights. Both in Congress and after retiring, in 1863, he severely criticized the administration of Lincoln and the prosecution of the war, always advocating immediate peace on any terms. This ultimately caused his arrest and trial for expressing treasonable sentiments and he was sentenced to prison in Ft. Warren. The sentence was soon changed by Lincoln to deportation across the Confederate lines, whence he went to the Bermudas and later to Canada. His party, the Peace Democrats, nominated him for governor of Ohio in 1863, but he was defeated by a large majority. After the war he fought against the Republicans, who he felt were treating the South too harshly, but by 1870 he realized that he was fighting for a useless cause. He died shortly afterward, his death resulting from the accidental discharge of a pistol at a trial, while he was illustrating his theory of how a murder had been committed.

Vallejo (*vā-lā'hō*), a city in Solano County, California, located in the heart of the industrial San Francisco Bay region, approximately 26 m. N.E. of San Francisco. It is on the Southern Pacific R.R. and is the home of the Mare Island Naval Shipyard. The surrounding country is a rich farm land, producing a variety of agricultural products, and is well known for its fruit production. Founded by Gen. Mariano Guadalupe Vallejo about 1850, the city was the capital of California from 1851 to 1853. Vallejo was incorporated in 1867. Population, 1900, 7,965; 1940, 20,072; in 1950, 26,038.

Valetta (*vā-lēt'tā*), or LA VALETTA, a seaport city of Malta, capital of that island, situated due

south of Sicily. It is strongly fortified and has a large and commodious harbor. The city occupies an elevated neck of land, about 2 m. long, on the extreme point of which is a powerful lighthouse. Among the chief buildings are the governor's palace, the Cathedral of St. John, and a number of schools and churches. It has several monuments erected to Italian leaders. The city has a library of 60,000 volumes and a university. The water supply is obtained by an aqueduct 9 m. long. It is named for John de la Valette (1494-1568), grand master of the Knights of St. John, who successfully defended the island of Malta against the Turks in 1566. Among the industries of the city is shipbuilding. It has manufactures of wine, cotton and silk textiles, pottery, and clothing, and has a considerable trade in grain, coal, wine, and fruits. During World War II Valetta served as one of Britain's main naval supply depots in the Mediterranean, and as such suffered severe damage from enemy bombers. Three out of every four homes in the city were destroyed in enemy bombings, and by April 1942 70 churches (including the Cathedral of St. John), 22 schools, 10 theaters, and 8 hospitals had been destroyed. Since the end of the war, the British government has set aside \$120,000,000 for repair work on Malta, a good part of which will be done at Valetta. Population, *ca.* 50,000.

Valley (*vāl'i*), a tract of land bordered by hills or mountains and usually drained by a stream. A valley is properly a strip of low land between hills or mountains, but in a larger sense the term is applied to the entire basin of a river, as the valley of the Nile and the valley of the Mississippi. Valleys are said to be *transverse* when they run across a range of mountains, and those that extend parallel to the principal ranges are termed *longitudinal*. Transverse valleys are usually narrow and have steep sides. Where they occupy high altitudes, as in the Alps, they are known as *passes*. The Simplon Pass of Switzerland and the Kabul Pass in the Himalayas are noted instances. In New England they bear the familiar but relatively local name of *notches*, of which Franconia Notch is the best known. Transverse valleys in low altitudes are termed *water gaps*, of which the Delaware Water Gap is an instance.

Erosion is the chief agency in the formation of a valley. Where the rocks decay and are acted upon by the frost, the erosion is more rapid, especially if the running stream has a swift current. Valleys formed in this way were originally narrow and bordered by steep walls, but the lapse of time caused them to be widened so as to form level tracts on one or both sides of the stream. In some instances the cause of valleys is assigned to the upheaval and depression of the crust of the earth. Such action is said to be volcanic or seismic (as in the rift valleys in Africa), but valleys formed

VALLEY CITY

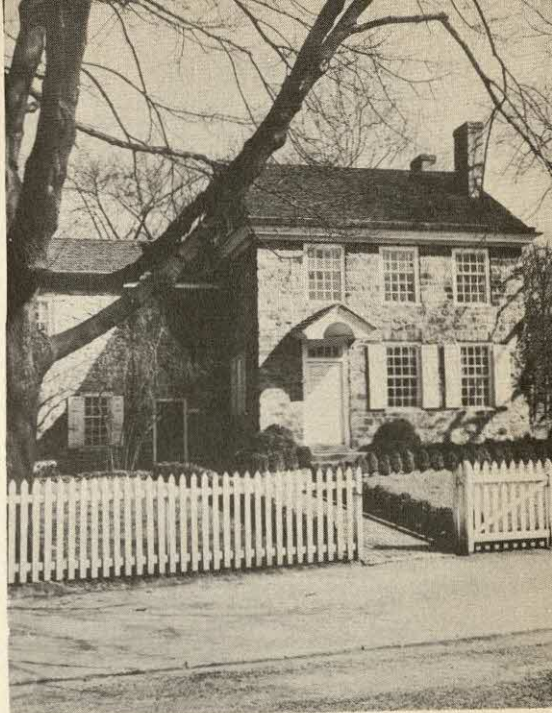
in this way are usually much shorter than those resulting from the action of streams. The action of glaciers produces glacial valleys, such as the fiords of Norway and the firths and lochs of Scotland. Many such formations are due to the agency of glaciers in the remote past, usually deepening and widening valleys already formed by running water. See also *Topography*.

Valley City (*vāl'i sīt'y*), county seat of Barnes County, North Dakota, 58 m. w. of Fargo. It is situated on the Sheyenne River, and on the Northern Pacific and the Minneapolis, St. Paul & Sault Ste. Marie R.R.'s. The surrounding country produces large quantities of wheat, flax, and vegetables. A state teachers college is located here. Valley City has a large trade in farm produce and merchandise. The North Dakota Winter Show is held here. Founded in 1872, Valley City was incorporated as a city in 1881. Population, 1940, 5,915; in 1950, 6,851.

Valley Forge (*vāl'i fōr'i*), a village in Chester County, Pennsylvania, 25 m. w. of Philadelphia, on the Schuylkill River and the Reading R.R. It is famous as the place where Washington's Continental Army of 11,000 men camped in the winter of 1777-78, after defeats at Brandywine and Germantown. The site was chosen after the Supreme Executive Council of Pennsylvania warned that that Colony would withdraw its support of the war for independence unless the Army remained encamped close to Philadelphia. Want of sufficient clothing and food caused great suffering among the men, and about 3,000 died from hunger and cold. General von Steuben (*q.v.*), who had come from Germany to assist the Americans, rendered valuable services by drilling and training the soldiers into a reorganized and efficient army. Washington abandoned the camp on June 19, 1778, and reoccupied Philadelphia.

Vallombrosa (*vāl-lōm-brō'sā*), a famous abbey of Italy, situated in a valley between the Apennines of Tuscany, about 15 m. e. of Florence. In the vicinity are fine groves of chestnut, fir, beech, and mulberry trees. It dates from 1038, when St. Giovanni Gualberto founded a house of monks subject to the rule of St. Benedict. The chief building was erected in 1637. The monastery was suppressed in 1863. The abbey of Vallombrosa is mentioned by Milton in "Paradise Lost."

Valmy (*vāl-mē'*), a village in the department of Marne, France, 35 m. s.e. of Rheims. It is famous as the scene of a battle on Sept. 20, 1792, when a German army under the Duke of Brunswick made an attack upon the French under Dumouriez and Kellermann, but was repulsed. The engagement is frequently spoken of as the cannonade of Valmy, owing to the bravery displayed by the assailants under a furious cannon-



Courtesy Chamber of Commerce of Philadelphia, Pa.

WASHINGTON'S HEADQUARTERS AT VALLEY FORGE

ade. It is classed as one of Creasy's "Fifteen Decisive Battles of the World," owing to the fact that it was the first triumph of the new republic established in France.

Valois (*vāl-wā'*), HOUSE OF, a dynasty of France. It was a branch of the Capetian dynasty, which possessed the throne from 1328 to 1589. The early monarchs of the line were able and valiant. They successfully resisted the incursions of the English, established the supremacy of the crown over the nobles, and gave France an eminent position among the nations of Europe. Francis I was one of the noted sovereigns of the house of Valois and was distinguished for his firm disposition and remarkable ability, but his successors were less fortunate and under their government the country became distracted by the rise of powerful nobles, internal dissent, and religious disturbances. Historically, the dynasty dates from 1285, when Philip III assigned to his younger son Charles the county of Valois, a region now included in the departments of Aisne and Oise. The Capet dynasty becoming extinct in 1328, the eldest son of Charles of Valois ascended the throne of France as Philip VI, thus founding the Valois dynasty. The sovereigns of the Valois line include the following: Philip VI (1328-50); John the Good (1350-64); Charles V (1364-80); Charles VI (1380-1422); Charles VII (1422-61); Louis XI (1461-83); Charles VIII (1483-98); Louis XII (1498-1515); Francis I (1515-47); Henry II (1547-59); Francis II (1559-60); Charles IX (1560-74); and Henry III (1574-89). The dynasty was suc-

ceeded in the last-mentioned year by the house of Bourbon.

Valparaiso (*vāl-pā-rā'zō*), a city in northwestern Indiana, seat of Porter County, 43 m. s.e. of Chicago. It is on the Pennsylvania R.R., the Grand Trunk Lines, and the Nickel Plate Road. Manufactures of the city include ball bearings, mica insulation, magnets, clothing, and machinery. Valparaiso, in 1958, had a value added by manufacture of \$14,765,000. The city is the seat of Valparaiso Univ. and Valparaiso Technical Inst. The site was settled in 1836 and the city incorporated in 1856.

Population, 1900, 6,280; in 1950, 12,028; in 1960, 15,227.

Valparaiso (*vāl-pā-rā'zō*), a city of Chile, on the Bay of Valparaiso, 88 m. n.w. of Santiago. It has a large and safe harbor, and ranks as the largest city and commercial center of the republic. Several railroads connect it with cities on the Pacific coast, and a transcontinental line furnishes communication with Buenos Aires and other cities on the Atlantic seaboard.

Valparaiso is one of the leading industrial centers on the Pacific coast of South America. The manufactures include tobacco products, clothing, earthenware, liquors, vehicles, sugar, machinery, and farming implements. Its interior and foreign trade is important, the commodities including chiefly lumber, minerals, livestock, hides, sugar, cereals, wool, and wine. Earthquakes have been frequent and have often badly damaged the city. Valparaiso was founded by the Spanish in 1544. In 1892, a force of Chileans made an attack upon the American ship *Baltimore* in its harbor; the difficulties were adjusted by the payment of an indemnity. Population, 1960, 259,241.

Value (*vāl'ū*), in economics, the worth of an object estimated by any standard of purchasing power, such as the market price or the amount of money considered equivalent to the utility or cost of it. It has been defined as the estimate of the amount of sacrifice necessary to attain an object that may be desired. It is also defined as the power of a commodity to obtain other commodities in exchange. However, *utility* and *scarcity* are two fundamental factors that enter into the matter of determining the value of any object, and when they are considered together they constitute the so-called *law of supply and demand*. The economic value of an object is determined by the supply (scarcity) of and demand (utility) for the object. By utility is meant the qualities in objects that make them desirable. Any object that does not possess utility is not considered of value, since no one would care to make a sacrifice unless the object gratifies some desire. Scarcity may be defined as the absence of an abundance, or as a limited supply when the demand is great, and under such conditions the value be-

comes proportionately higher. In general, value is spoken of as the price of an article and money is termed the *measure of value*. See also *Wealth*.

Valve (*vāl'v*) in mechanics, a device for controlling the flow of fluids. Velocity control is achieved by varying the open area of the valve, as in the common water faucet. Directional change is effected with a valve containing several discharge ports. The fluid can be discharged through any of the ports by a rotation of the valve, or cock. Similar valves are used in musical instruments in which air is directed into tubes of different length, producing sounds of different pitch. A *needle valve*, as found in the carburetors of automobiles, is a pressure-control valve in which a tapered pin is fitted into the valve opening. The pin is threaded, and can be turned like an ordinary screw, to adjust the fluid pressure. The *flap valve* in a hand pump opens when the pressure inside the pump is greater than the pressure outside. Spring tension holds closed the valve in an automobile tire.

The internal combustion engine, the diesel engine, and the steam engine employ valves for admitting and removing gases from the pistons. The valve systems or types vary with the engine, but in general they are plugs that fit tightly into the port through which the gas must pass. The opening and closing of the valves are controlled to permit the gases to flow at the proper time.

The vacuum tube in electronics is an electron valve.

Value Added by Manufacture. See *Manufactures, Census of*.

Vámbéry (*vām'bā-rē*), ARMINIUS, author and statesman, born in Duna-Szerdahely, Hungary, Mar. 19, 1832; died Sept. 15, 1913. He studied at Pressburg, where he became distinguished as a student of languages, and in 1848 took part in the national revolution. Subsequently he settled in Constantinople, where he studied Oriental languages, and afterward made extensive tours through Asia Minor, Persia, and Turkestan. In 1864 he became professor of Oriental languages at the Univ. of Budapest.

His writings include a "German-Turkish Dictionary" (1858), "History of Bokhara" (1873), "Primitive Civilization of the Turko-Tartars" (1879) and "Hungary" (1887).

Vampire (*vām'pīr*), in folklore, a term applied to blood-sucking ghosts or souls of human beings. According to Slavic folklore, the vampire rises from its grave at night to suck the blood of sleeping persons, especially children, who later die for no apparent reason. The corpse of the vampire remains fresh and plump, its bloody mouth revealing its nocturnal occupation. According to medieval beliefs, vampirism was not necessarily a matter of choice. Witches, wizards, suicides, and criminals, as well as all others who

died under ecclesiastical ban, were popularly supposed to become vampires; they were sent forth by the devil to devour their living acquaintances and create new vampires, since their victims might become vampires. The spirits of innocent persons could also become vampires if a cat or a bird crossed the graves. It was possible to conquer vampires by burning them, chopping off their heads, or driving stakes into their hearts. Fear of vampires and the practice of burying suicides with stakes through their bodies continued in some countries as late as the 19th century.

The term vampire is also used to denote three genera of bats of Central and South America: *Desmodus*, *Diphylla*, and *Diaemus*. They are all small, about 3 in. from head to tail, and live entirely on blood from birds and mammals they attack at night. The wound they make with their sharp teeth is a shallow scoop, which is cut so painlessly that the victim does not awaken, although blood may ooze from these wounds for several hours after the bat has lapped his fill. Horses, cattle, goats, chickens, dogs, and men are all victimized. It has been demonstrated in Panama that murrina, a deadly trypanosome disease of horses and mules, which has killed large numbers of animals, is spread by the common vampire, *Desmodus rotundus*. In eastern South America, vampires are responsible for spreading a form of rabies which, in Trinidad, Argentina, Paraguay, Uruguay, and Brazil, has been responsible for the loss of thousands of cattle and horses. There are several strains of virus involved, for in Brazil humans and dogs seemed immune, but in Trinidad humans also died. The loss of blood from vampires is serious only in birds or in cattle when heavily attacked.

Van (*vān*), a town in eastern Asiatic Turkey, ca. 5,600 ft. above sea level, capital of the vilayet (area, 13,583 sq. m.; population, 1955, 176,203) of the same name. It is situated on the southeastern shore of LAKE VAN (ca. 1,430 sq. m.), a salt lake with no outlet to the sea. Van was the capital of the ancient kingdom of Ararat or Urartu and the fulcrum of Armenian civilization (see *Armenia*). Fortifications dating back to the 8th century B.C. have been discovered here. Van early passed from the control of its original rulers and was successively subject to many peoples down to 1534, in which year it was absorbed into the Ottoman Empire. Van today is the trade center of a fertile wheat-growing region. Population, 1955, 20,399.

Vanadium (*va-nā'di-ūm*), a metallic element (atomic number 23, atomic weight 50.95, symbol V), the hardest of all metals (melting point, ca. 1,700° C.). It is used in alloy steels and other applications. Vanadium is a steel-gray metal and can take a very high polish. It always occurs in

combination with other elements, as in vanadinite, in which it is combined with lead and chlorine. The element was discovered in iron ore by N. G. Sefstrom in 1830. It is used to add toughness to steel; as a catalyst; and, in the form of its compounds, as a paint drier, photographic developer, and in dyes.

Van Allen Radiation (*vān ăl'ēn rā-dī-ă'-shūn*), an intense radiation concentrated in two belts, or zones, around the earth. It was discovered in 1958 by James A. Van Allen of the State Univ. of Iowa and his associates. The radiation consists of energetic electrically charged particles, presumably protons and electrons. The outer Van Allen zone, extending from two to three earth radii out to perhaps ten earth radii, is believed to originate in ion streams emitted by the sun which have been trapped by the earth's magnetic field. The inner Van Allen zone, a doughnut-shaped region surrounding the geomagnetic equator, is within an earth radius of the earth's surface and is believed to originate in the decay of "albedo neutrons." (Albedo neutrons are neutrons, produced in the earth's atmosphere by collisions between primary cosmic rays and atmospheric atoms, which escape from the earth. Free neutrons decay into electrons and protons with a half life of about 12 min.) Van Allen radiation was first discovered by an analysis of data obtained from Geiger counters placed in earth satellites Explorer I and Explorer III, and a complete picture of the radiation emerged from measurements made with instruments in the later satellite Explorer IV and in the space probes Pioneer I and Pioneer III. The intensities and locations of the Van Allen belts fluctuate with time and the variations of sunspot radiation; they constitute potential hazards to manned space travel. See also *Astronautics*; *Earth Satellite*.

Vanbrugh (*vān'brū*), SIR JOHN, dramatist and architect, born in London, England, in January 1664; died there, March 26, 1726. He was descended from a Flemish family which had migrated to England. The events of his life are obscure; however, it is known that he was arrested for espionage in France and imprisoned for two years (1690-92), during which time he began to write plays. His two most successful comedies, "The Relapse" (1696) and "The Provoked Wife" (1697), are typical Restoration dramas, characterized by a coarse Rabelaisian humor, inventiveness, and originality of wit. Among his adaptations are "Squire Trelooby" (1704), which is derived from Molière, and "Confederacy" (1705), based on a work by Dancourt. Despite his literary success, Vanbrugh was primarily an architect—the builder of elaborate country homes and castles, including the mansion at Blenheim Park.

Van Buren (*vān bū'rēn*), MARTIN, eighth President of the U.S., born in Kinderhook, N.Y.,



Courtesy Metropolitan Museum of Art, N. Y.

MARTIN VAN BUREN

Painting by Henry Inman (1801-46)

Dec. 5, 1782; died there, July 24, 1862. A descendant of the early Dutch settlers of New York, he studied law in a New York City office, married Hannah Hoes in 1807, and became increasingly active in state politics. He served in the state senate (1813-20), becoming a leader in the Democratic party of New York State. A bitter rival of the De Witt Clinton faction in the party, Van Buren became one of the principal figures in the Albany Regency (*q.v.*). He later ardently supported President Andrew Jackson (*q.v.*), resigning (1829) as governor of New York (to which post he was elected in 1828) to accept Jackson's appointment as U.S. Secretary of State. His loyalty to Jacksonian policies during the mounting hostility between Jackson and his Vice President, John C. Calhoun (*q.v.*), won him Jackson's lasting favor. As Jackson's running mate (1832), he was elected Vice President; and, with Jackson's backing in 1836, Van Buren was nominated by the Democrats and was subsequently elected to the Presidency.

In 1837 the boom of 1834-36 collapsed, and the new administration had to bear the political consequences. Van Buren refused to rescind Jackson's Specie Circular, and he approved the Independent Treasury system for handling the government's fiscal affairs with a minimum resort to the banks. He was the first President to recognize the new claims of labor; an Executive Order legalized a 10-hour day in government establishments. Economic crisis, crop failures, and Whig substitution of slogans for issues combined to defeat him in 1840.

VANCOUVER

Van Buren has been considered by some historians to be no more than a suave and particularly skillful manipulator of patronage who helped fasten the spoils system (*q.v.*) on national politics. He had, however, courage enough to oppose the annexation of Texas—which, as Jackson's Secretary of State (1829-31), he had tried to buy for the U.S.—and vision enough to see American democracy as an experiment of world concern. He opposed the extension of slavery to the point of breaking with his party and running as an independent on the Free Soil ticket in 1848. Although he returned thereafter to the party fold because he saw most hope of preserving the Union in maintaining the Democratic party as a non-sectional power, when that hope failed he gave his confidence to Lincoln. At the Jefferson Day dinner in 1832, Van Buren had given "Mutual forbearance and reciprocal concessions" as his toast, but he had helped Jackson draft the famous "Our Federal Union, it must be preserved."

Vancouver (*vān-kōō'vēr*), county seat of Clark County, Washington, 6 m. N. of Portland, Ore., on the Columbia River and on the Northern Pacific, the Great Northern, and other railroads. It also has steamboat facilities. It is surrounded by an agricultural area. Manufactures include aluminum, abrasives, paper, sportswear, canned foods, and chemicals. There are lumber and plywood mills and a substation for distribution of hydroelectric power generated at Grand Coulee and Bonneville dams. Vancouver was settled in 1825 and incorporated as a village in 1858 and as a city in 1889. Population, 1950, 41,664.

Vancouver, a city of Canada, largest city of British Columbia. Situated on Burrard Inlet and



Photograph by Canadian Pacific Ry.

VANCOUVER, B.C.

Aerial view of the business section

English Bay, it is bounded on the south by the Strait of Georgia. The chief port of Canada, it has steamship connections with Victoria, Seattle, and many ports throughout the world. The city is the western terminus of the Canadian National and the Canadian Pacific Rys. and the transcontinental airlines. A system of electric railways connects Vancouver with other towns.

The city is surrounded by a productive agricultural, lumber and livestock area, and enjoys a large trade in produce, minerals, and merchandise. The principal industries are lumber, shipbuilding, furniture, glass, sugar, canned fruits, carriages and wagons, malt and distilled liquors, clothing, brooms, vinegar, soap and cigars. There are extensive railroad machine shops.

Noteworthy buildings include the station of the Canadian Pacific R.R., the courthouse, the post-office, the city hall, the Univ. of British Columbia, the Teachers' Coll., the military station, several hospitals, and numerous schools and churches. The city has a great number of parks.

Formerly an unbroken forest, the city was incorporated in 1886. With completion of the railroad it grew steadily in importance to its current position as the third largest city in Canada. Population, 1951, 344,833.

Vancouver Island (*vān-kōō'vēr ī'land*), an island off the Pacific coast of North America, lying w. of the mainland of British Columbia and n.w. of the State of Washington; the largest of a great archipelago containing many hundreds of islands.

It is separated from British Columbia by Queen Charlotte Sound and the Strait of Georgia; and from the State of Washington by the Strait of Juan de Fuca. The length from southeast to northwest is 282 m.; its average width is from 50 to 60 m.; and its area, 12,408 sq. m. The surface is essentially a mountain range with a number of fertile valleys and a narrow coast. Mountain formations of cretaceous age are found here and are mainly formations of continental origin and carry coal-seams but also include sediments of marine and volcanic origin. The major part of Vancouver Island has typical coast range flora. The southeastern section, however, has vegetation of quite different type, the growth being influenced by comparatively slight precipitation with little rain between spring and fall. In addition, this section is characterized by many species of more or less Californian type, such as brome grasses, wild hyacinth, blue-eyed grass, spring beauty, and lupines, which occur nowhere else in Canada. There are splendid forests in the valleys and mountains. The mountains, of which Mt. Elk Horn is 7,200 ft. high, rise to heights ranging from 3,500 to 7,200 ft. The shores of Vancouver Island on the west coast are largely precipitous and rocky; the east coast, indented with

many deep-water harbors, affords fine shipping facilities for the many industries. Major rivers and lakes on the island number 17 and 22 respectively. Minerals include gold, copper, iron, and coal, the latter being worked extensively. Agriculture, stock-raising, and salmon fishery are pursued successfully. Lumber, logging, fur, and canning industries flourish. The climate of Vancouver Island is greatly tempered by the Pacific, its temperature seldom falling below 15° and rarely rising above 85°. This is due to a great extent to the proximity of the warm Japanese current off the western coast.

Victoria (*q.v.*), at the southern extremity of the island, is the capital of the province of British Columbia. A railway extends from Victoria to the coal fields in the vicinity of Nanaimo and up as far as Courtenay, 141 m. from Victoria. Esquimalt, near Victoria, has a fine harbor and is Canada's naval base on the Pacific.

The island is named for Capt. George Vancouver (1758-98) who officially discovered it in 1792, though it had been visited by Juan de Fuca in 1592. Capt. Cook surveyed a part of the coast in 1778 and Capt. Vancouver later prepared a map of it and of the waters separating it from the mainland. The island was long claimed by the U.S., but it has been a British possession since 1846. In 1849, it was made a colony, but it was not united with the province of British Columbia until 1866, since which date it has remained a part. Population, 1941, 121,933.

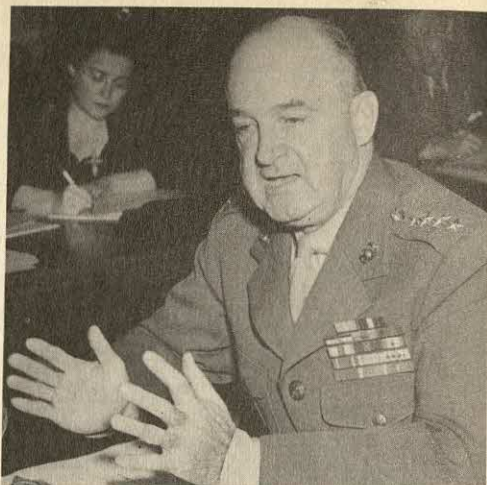
Vandals (*vān'dalz*), a collective term used by early writers to refer to some of the ancient Teutonic tribes. According to the Byzantine Greek historian Procopius (died ca. 562), they originally occupied the region near the Sea of Azov. Later they seem to have migrated northwest to settle between the Oder and Vistula Rivers, south of the Baltic Sea. When they emerged into history in the 2nd century A.D. they are found in the region northeast of the Giant Mts. (Riesengebirge) in Central Europe. They fought with their allies, the Marcomanni, against the Romans during the Marcomannic War (167-68) and plundered Pannonia, southwest of the Danube River. In the 3rd century, they fought in the Roman province of Dacia (modern Transylvania and Rumania). In the time of Constantine I (288-337), they were badly defeated by Geberic, King of the Goths; those who survived were allowed by the Romans to settle in Pannonia (ca. 334 A.D.) where they remained peacefully for half a century. In 406 A.D., they allied themselves with several other Germanic tribes and invaded Gaul, but as they could not withstand the superior forces of the Franks, they crossed the Pyrenees into Spain with their king, Gunderic (409), and settled in two regions, Vandalitia (modern Andalusia) and Galicia. In 428 or 429, however, the entire nation, numbering

VANDEGRIFT

some 80,000, crossed the Straits of Gibraltar to Africa, where the Vandal king, Gaiseric, conquered all of Roman Africa, with the exception of three cities, Carthage, Hippo (Bovja), and Cirta (Constantine). At the conclusion of a short truce between Gaiseric and the emperor, Valentinian III, the latter retained only the important consular province of Carthage, and in 439 Gaiseric captured Carthage.

For almost a century, the Vandals held dominion over North Africa from Cirenaica to the Atlantic Ocean, including the Balearic Islands, Corsica, Sardinia, and part of Sicily. Gaiseric built a powerful fleet whose buccaneering exploits were the terror of all the Western Mediterranean for more than 30 years. In 455, Gaiseric undertook his memorable expedition to Rome, capturing that city without difficulty and sacking it methodically. Apparently, the Vandals did not indulge in ruthless and pointless destruction of property and art and literary treasures, as the modern meaning of the words vandal and vandalism would indicate. The connotation of these words probably was derived from the terrible cruelties which the Vandals, as Arian Christians, inflicted on orthodox Catholics. Gaiseric's son, Hunneric (477-84), continued the fierce piracy and engaged in bloody battles with the Moorish peoples in Africa, but his successors were less energetic and more inclined to religious tolerance. This mild government so weakened the Vandal empire that Thrasamund (496-523) was obliged to call on his brother-in-law, the Ostrogothic king, Theodoric the Great, to send an army to aid him in his wars against the Moors of Tripoli. Hilderic (523-30), the son of Hunneric and Eudocia, widow of Valentinian III, was a timid, unpopular king, a Catholic who restored the Catholic churches in Africa, and was finally dethroned and murdered. This persecution of a Catholic provided an excellent excuse for the Greek emperor Justinian to send an army against the Vandals. The Byzantine general, Belisarius, conquered the Vandals in 533, and the Vandal king, Gelimer, was paraded through the streets of Constantinople in 534. After 536, the Vandals no longer figure as a nation in history.

Vandegrift (*văn'de-grift*), ALEXANDER ARCHER, Marine Corps commandant, born in Charlottesville, Va., March 13, 1887. After attending the Univ. of Virginia he was commissioned a 2nd lieutenant in the Marine Corps in 1909. In succeeding years he was on foreign duty in Nicaragua, Mexico, Haiti, and China, and served in Washington, D.C., with the Bureau of the Budget and with headquarters of the Marine Corps commandant. In 1941 he was assigned to the 1st Marine Division, which he commanded in its assaults on Guadalcanal, Tulagi, and Gavutu of the Solomon Islands and in its defense of these



ALEXANDER A. VANDEGRIFT

islands against heavy and repeated enemy attack from August to December 1942. He was awarded the Navy Cross and the Medal of Honor for this campaign. He also commanded the initial landings on Bougainville, in the northern Solomons. Returning to the U.S., Vandegrift served as commandant of the Marine Corps (January 1944-January 1948). In 1945 he was made a four-star general, the first marine on active duty to achieve this rank. He retired from the service in April 1949.

Vandenberg (*văn'den-bêrg*), ARTHUR HENDRICK, U.S. Senator, born at Grand Rapids, Mich., March 22, 1884; died there April 18, 1951. He attended the Univ. of Michigan (1901-2) where he secured legal training. Subsequently he was associated with *Collier's Weekly* and later became editor of the *Grand Rapids Herald*. In 1928, he was appointed to the U.S. Senate from Michigan



Courtesy Press Association, Inc.

ARTHUR H. VANDENBERG

to fill a vacancy. Through re-election, he remained in office until his death. A Republican, in the period preceding World War II he was a spokesman for the isolationists in the Senate. He dramatically changed his position in January 1945 and thereafter was one of the architects of the bipartisan foreign policy of international cooperation—in the U.N., and in such programs as the E.R.P. and N.A.T.O. He was chairman of the Foreign Relations Committee and president pro tempore of the Senate of the 80th Congress. A delegate to the Charter Conference of the U.N. in 1945, he was one of the first U.S. delegates to the U.N. He also served as a delegate to other postwar international meetings. Vandenberg was mentioned as a candidate for the Republican Presidential nomination in 1940, 1944, and, particularly, in 1948. "The Private Papers of Senator Vandenberg," edited by his son, Arthur H. Vandenberg, Jr., and Joe Alex Morris, appeared in 1952.

Vandenberg, HOYT SANFORD, Air Force officer, born in Milwaukee, Wis., Jan. 24, 1899; died in Washington, D.C., April 2, 1954; nephew of Sen. Arthur H. Vandenberg (*q.v.*). A graduate of West Point, he was attached to the Army Air Forces after 1923. He was assistant chief of staff (1940-41) of the Army Air Forces and served (1942-43) in North Africa. Deputy chief (1943-47) and chief (1947) of the Army air staff, he was made chief of staff of the U.S. Air Force in 1948 and served until 1953.

Vanderbilt (*vän'dēr-bilt*), CORNELIUS ("Commodore"), financier and philanthropist, born near Stapleton, Staten Island, N.Y., May 27, 1794; died in New York City, Jan. 4, 1877. He was descended from a family of early Dutch settlers. Though lacking in formal schooling, he showed

remarkable skill as a businessman. In 1810 he started a ferry service from Staten Island to New York City. He built up a shipping business of great magnitude, and became wealthy while yet a young man. After 1857, he gradually withdrew his investments from steamship lines and placed his capital in railroad stocks. He secured control of a number of railroads and established the New York Central & Hudson River R.R., direct ancestor of the present New York Central System. By 1873 his control extended over 2,000 m. of railroad lines. He donated \$1,000,000 to found Vanderbilt Univ. (*q.v.*).

Vanderbilt, CORNELIUS, financier, son of William Henry Vanderbilt, born at New Dorp, Staten Island, N.Y., Nov. 27, 1843; died Sept. 12, 1899. He was educated privately and began his business career as a bank clerk in New York City. In 1865 he took a position with the New York & Harlem R.R., of which he was treasurer a number of years. He was made chairman of the board of directors of the New York Central R.R. in 1886, and for many years was an official in numerous railroad corporations. Besides aiding Vanderbilt Univ., he was a liberal patron of Yale Univ. and several New York City institutions, including the Cathedral of St. John the Divine.

Vanderbilt, WILLIAM HENRY, son of Cornelius Vanderbilt (1794-1877), born at New Brunswick, N.J., May 8, 1821; died Dec. 8, 1885. He attended a grammar school and later received private instruction. At the age of 18 he became a bank clerk and in 1864 was associated with his father in the management of the New York & Harlem R.R. As a businessman he was singularly successful; his energies were devoted to the development of the Vanderbilt system of railroads. In 1877, at the death of his father, he became president of the New York Central & Hudson River lines. He made many gifts to Vanderbilt Univ., to several New York City institutions, and paid the cost of moving the Egyptian obelisk to Central Park, New York City.

Vanderbilt, WILLIAM KISSAM, financier, son of W.H. Vanderbilt, born on Staten Island, New York, Dec. 12, 1849; died July 22, 1920. He received an academic education and later studied at Geneva, Switzerland. After returning to America, he became a clerk in a railway office. He was made vice president of the New York Central R.R. in 1877, and in 1883 became chairman of the board of directors of the Lake Shore & Michigan Southern R.R. Later he was a member of the board of directors of numerous railroads and was associated with the Pullman Co. and the American Horse Exchange. He contributed liberally to charities, particularly the Vanderbilt Clinic in New York City.

Vanderbilt University, an institution of higher learning at Nashville, Tenn., chartered



Courtesy New York Central System

in 1872 and opened in 1875 after a gift of \$1,000,000 from Cornelius Vanderbilt (*q.v.*) made possible its completion. It comprises a college of arts and sciences; schools of engineering, nursing, law, medicine, and religion; and a graduate school. There are *ca.* 3,500 students and 385 members of the faculty. The library has 750,000 volumes. The physical plant is valued at \$18,600,000.

Van der Goes (*vän' dër-gōōs'*), HUGO, painter, probably born in Ghent, the Low Countries (now Belgium), in 1440; died in the monastery of Roode Klooster, near Brussels, in 1482. In 1467 he became free master of the painters' guild in Ghent. Following at first the tradition of Rogier van der Weyden (*q.v.*), he later showed greater individuality. Affected by a mental illness in 1475, he shortly afterward retired into the solitude of a monastery. Besides some portraits and altarpieces ("Death of the Virgin," "Christ Lamented," and "Adam and Eve"), he is most famous for the large altarpiece, the so-called Portinari Altarpiece (1475), commissioned by Tommaso Portinari, the agent of the Medici in Bruges, and sent to Florence for the Hospital of Santa Maria Nuovo (it is now in the Uffizi Gallery in Florence, Italy). Its center panel, depicting the Adoration of the Shepherds, shows an intenseness of expression and a naturalism in observation that left a definite influence on a later work, the "Adoration of the Shepherds" by Ghirlandajo (*q.v.*).

Vanderlyn (*vän'dër-lin*), JOHN, painter, born in Kingston, N.Y., Oct. 15, 1775; died there, Sept. 23, 1852. At the age of 16 he entered the employ of the Englishman Thomas Barton, then chief importer of engravings in New York. Aaron Burr recognized Vanderlyn's artistic gift and encouraged him to pursue his art studies. He studied with Gilbert Stuart in Philadelphia, Pa., returning to New York after a year to begin his professional career as a portrait painter. He studied in Paris (1796-1801), where he acquired accurate draftsmanship as introduced by Jacques Louis David (*q.v.*), and returned with many copies and studies he had made abroad. In 1803 he again went to France and, later, England. With Washington Allston (1779-1843), he traveled and lived in Rome (1805-07). Best known among Vanderlyn's historical paintings are "Ariadne," in the Pennsylvania Acad. of Fine Arts; and "Landing of Columbus" (1842), a panel in the Rotunda of the Capitol, Washington, D.C.

Van der Meer (*vän'dër-mär'*), JAN. See *Vermeer, Jan*.

Van der Stucken (*vän'dër-stük'ən*), FRANK VALENTIN, composer and conductor, born in Fredericksburg, Texas, Oct. 15, 1858; died in Hamburg, Germany, Aug. 16, 1929. He was

taken to Antwerp as a child, where he studied music with Pierre Benoit (1834-1901). Later he studied at the Univ. of Leipzig. After a two-year tour of Europe, he was for a year (1881-82) *Kapellmeister* at the city theater of Breslau. Returning to the U.S., he served as director (1884-95) of the Arion Society, a male chorus; conductor (1895-1907) of the Cincinnati Orchestra; and director (1897-1903) of the Cincinnati Conservatory of Music. He pioneered in presentation of concerts of all-American compositions. Among his own works are the opera "Vlasda" and many shorter pieces, including songs and marches. After 1908 he lived in Europe.

Van der Waals (*vän'dër-väls'*), JOHANNES DIDERIK, physicist, born in Leyden, Holland, Nov. 23, 1837; died in Amsterdam, March 9, 1923. He taught physics at the Univ. of Amsterdam from 1877 until his retirement in 1907. His doctoral thesis (1873) described his important discovery that gaseous and fluid states might be continuously transformed into each other. He also evolved the theory of corresponding states of gases and liquids, which led to his explanation of binary and ternary mixtures (1890) and later to perfection of the thermodynamic theory of capillarity. For this research he was awarded the 1910 Nobel Prize for physics.

Vandeveld (*vän-dë-vël'dë*) OF VAN DE VELDE, a family of Dutch marine and landscape painters. WILLEM THE ELDER was born in Leyden, Holland, in 1611; died in London, England, in 1693. He early became well known in his native country for his marine paintings, most of them executed only in shades of black and white, vividly depicting the types of boats and the methods of naval warfare of his day. He was appointed court painter to both Charles II and James II of England, and he lived in London from 1673 until his death.

He had two sons who were also painters. WILLEM THE YOUNGER was born in Amsterdam, Holland, in 1633, and died in London, England, in 1707. Like his father, under whom he studied, he was a marine painter, but most of his work was done in color; he preferred grayish-blue and brownish shades. From 1674 he lived principally in London, where he had gone when Charles II appointed him to assist his father. His work has been highly admired, one writer calling him "the Raphael of marine painting." ADRIAN, the other son of Willem the Elder, was born in Amsterdam, about 1636, and died there in 1672. Besides studying with his father, he also worked with the landscape and animal painter, Philip Wouverman, in many of whose landscapes he later executed the figures. Subsequently he became a landscape painter himself, but he is also known for his paintings of religious subjects and for his etchings.



CBS Photo

CARL VAN DOREN

Van Diemen's Land (*văn đễ'menx lănd*). See *Tasmania*.

Van Dine (*văn đin*), s.s., pseudonym of Willard Huntington Wright (*q.v.*).

Van Doren (*văn đở'rlen*), CARL CLINTON, editor, author, critic, born in Hope, Ill., Sept. 10, 1885; died in New York City, July 18, 1950. He was graduated from the Univ. of Illinois in 1907, and afterward took his doctor's degree at Columbia Univ. He remained at Columbia, as a member of the English department, until 1930. During the same period, he was the managing editor of the "Cambridge History of English Literature" and literary editor of the *Nation* and the *Century Magazine*. In 1926, he founded the Literary Guild of America, acting as its editor in chief, a position which he held from 1926 to 1934. Van Doren has published the following critical works: "The American Novel" (1921), "Contemporary American Novelists" (1922), "James Branch Cabell" (1925), "Swift" (1930), "Sinclair Lewis" (1933), and "American Literature—An Introduction" (1937). With his brother, Mark Van Doren (*q.v.*), he published "American and British Literature Since 1900" (1925). His fictional works include a group of short stories ("Other Provinces," 1925), and a novel ("The Ninth Wave," 1926). His historical works include "Benjamin Franklin" (1938), which won a Pulitzer Prize; "Secret History of the American Revolution" (1941); "Mutiny in January" (1943); "The Great Rehearsal" (1948), and "Jane Mecom," published posthumously (1950). A "Portable Carl Van Doren" was published in 1945. Basing his works on industrious and conscientious research, Carl Van Doren emerged as a major biographer, and in his lifetime was considered a sound and widely influential literary critic.

Van Doren, MARK, author and educator, born



Photo by L. Nelson, courtesy Macmillan, N. Y.

MARK VAN DOREN

in Hope, Ill., June 13, 1894. Following in the footsteps of his brother, Carl Van Doren (*q.v.*), he attended the Univ. of Illinois and Columbia Univ. During World War I, he served in the infantry. He took his doctor's degree at Columbia, where he later became an associate professor of English. For the *Nation*, he served as literary editor (1924-28) and as motion-picture critic (1935-38). He has written novels ("Windless Cabins," 1940) and short stories ("The Night of the Summer Solstice and Other Stories of the Russian War," 1943). His "Collected Poems" (1939) won a Pulitzer Prize. Among the volumes of poetry which he has published since that date may be mentioned "The Seven Sleepers and Other Poems" (1944). He has published critical studies of Thoreau (1916) and of Dryden (1920). Among the anthologies he has edited the most famous is his "An Anthology of World Poetry" (1928). In 1945 he edited "A Portable Walt Whitman." "The Noble Voice," a study of 10 great poems, appeared in 1946. He is primarily interested in poetry, not only as a critic, but especially as a creative writer. An accomplished craftsman, he has avoided contemporary issues, seeking rather for topics of universal appeal.

Van Dorn (*văn đở'n*), EARL, soldier, born at Port Gibson, Miss., Sept. 17, 1820; died May 8, 1863. He was graduated from West Point in 1842 and took part in the Mexican War, in which he saw active service at Contreras, Cerro Gordo, and Churubusco. At the capture of the City of Mexico he was wounded. In 1849 he took part in the war with the Seminoles and later with the Comanches. During the Civil War he fought efficiently in the Confederate service. At the beginning of the war he raised a regiment in Texas, of which he became colonel, and in 1862 was promoted to major general. He was defeated at Pea Ridge in 1861 and was again defeated at Corinth in 1862.

Superseded by Gen. John C. Pemberton, Van Dorn led a cavalry raid at Holly Springs which disrupted Grant's attack on Vicksburg. Some months later, Van Dorn was shot by a personal enemy.

Van Druten (*vân drōō'tn*), JOHN WILLIAM, playwright and novelist, born in London, England, June 1, 1901; died in Indio, Calif., Dec. 19, 1957. He was educated at Univ. Coll. in London, later studied law at the Univ. of London, and was special lecturer in English law at the Univ. Coll. of Wales, 1923-26. In 1926 his play, "Young Woodley," was produced in New York City, and shortly thereafter he came to the U.S. In 1928 he began to devote himself solely to writing. His plays include "There's Always Juliet" (1931), "The Voice of the Turtle" (1943), "I Remember Mama," from Kathryn Forbes' book (1944), "Bell, Book and Candle" (1950), and "I Am A Camera" (1951), adapted from "The Berlin Stories" by Christopher Isherwood. Van Druten, most successful as a writer of comedy, was particularly noted for the skill with which he handled his material. He frequently directed his own plays and also directed Rodgers' and Hammerstein's musical play "The King and I." He also wrote several novels and an autobiography, "The Way to the Present" (1938). In 1951 he was elected to the National Inst. of Arts and Letters.

Van Dyck (*vân dik'*), OF VAN DYKE, SIR ANTHONY, painter, born in Antwerp, March 22, 1599; died in London, England, Dec. 9, 1641. After his apprenticeship with Henry van Balen in Antwerp, he worked under Peter Paul Rubens (*q.v.*). In 1620 he left the studio of the latter to spend, after a few months' sojourn in England, five years in Italy, where he came in touch with Italian painters in Rome, Genoa, and Venice. Charles I invited him to England (1632) and soon after knighted him and awarded him a residence and a pension. Except for the years 1634-35, spent in the Low Countries, where he was elected honorary president of the guild of painters in Antwerp, Van Dyck stayed in England, enjoyed the life and splendor of the English court, and became an international courtier.

Next to Rubens, Van Dyck was the most important Flemish painter of the 17th century, excelling in portraiture as well as in the representation of religious and historical topics. He was first clearly under Rubens' influence, but in his mature style he always showed strongly individual traits. Refinement and elegance are characteristic of his paintings, expressed not only in the composition, in the choice of poses, but especially in his treatment of the sitters' faces and in his color preferences. There is hardly any other painter who uses black with so many nuances and shadings. Van Dyck's style of portraiture, in the 18th century, became the ideal of English portrait painters. His works are repre-



Courtesy Metropolitan Museum of Art, N. Y.

**JAMES STUART, DUKE OF RICHMOND AND LENNOX
PAINTING BY ANTHONY VAN DYCK**

sented in almost all of the great museums in Europe and the U.S. Among the subjects of his most famous religious paintings, each executed in several versions, are "Christ on the Cross," "The Adoration of the Shepherds," and "The Deposition." Among his portraits are "Cardinal Bentivoglio" (1622-27), "Marchesa Grimaldi" (1622-27), the equestrian portrait of Charles I (*ca.* 1635), and "Three Children of Charles I" (1635).

Van Dyke (*vân dik'*), HENRY JACKSON, clergyman and author, born in Germantown, Pa., Nov. 10, 1852; died at his home, "Avalon," near Princeton, N.J., April 10, 1933; son of Henry Jackson van Dyke (1822-91), a prominent clergyman. He was graduated from Princeton Theological Sem. (1877). Pastor of the United Congregational Church of Newport, R.I. (1879-82), and of the Brick Presbyterian Church in New York, N.Y. (1883-99), he served as moderator (1902-03) of the General Assembly, Presbyterian Church in the U.S.A. His work as chairman of the committee on "The Book of Common Worship," completed in 1931, is regarded as his most important church contribution. Van Dyke was professor of English literature at Princeton Univ. (1899-1913; 1919-23). His writings on re-

ligious and secular subjects include "The Reality of Religion" (1884); "The Story of the Other Wise Man" (1896), a moralistic tale; and "The Toiling of Felix" (1900), poetry.

Vane (*vān*), SIR HENRY, political official, born in Hadlow, England, Feb. 18, 1589; died in 1654; father of Sir Henry Vane (*q.v.*). Educated at Oxford Univ., he was admitted to Gray's Inn in 1606 and was knighted by James I in 1611. Vane gained a fortune through the purchase of court offices. He was a member of Parliament in 1614-29 and in the Short Parliament (1640) and was appointed treasurer of the king's household (1639) and secretary of state (1640). After playing an important part in the impeachment of Strafford (*q.v.*) which led to the earl's execution, Vane fell into disfavor and was dismissed by Charles I in 1641. He immediately joined the opposition to the royalists in the Long Parliament and was named lord lieutenant of Durham in 1642. He continued in Parliament under the Commonwealth but held no high state office.

Vane, SIR HENRY, statesman, baptized in Debden, England, on May 26, 1613; executed in London, June 14, 1662; known as Sir Harry Vane or Sir Henry Vane the younger, to distinguish him from his father (*see above*). He was educated at Westminster and Oxford and served in various embassies on the Continent. A devout Puritan, he emigrated (1635) to Massachusetts, where he was elected governor in 1636. His sympathy with Anne Hutchinson (*q.v.*) was unpopular with the colonists, and he was defeated for reelection by John Winthrop (*q.v.*). Vane returned (1637) to England, where he became joint treasurer of the navy, was elected to Parliament, and was knighted (1640). Although he was a leader (1643-46) of Parliament during the first civil war and was instrumental in gaining Scottish support for the Puritans (1643, *see Covenanters*), he opposed the supremacy of the army after 1646 and the deposition and execution (1649) of Charles I. Prominent in the government of the Commonwealth, he broke with Oliver Cromwell (*q.v.*) over the dissolution of the Rump Parliament in 1653. Later, Vane helped to overthrow the Protectorate. Arrested and tried for treason after the Restoration (1660), he was convicted and executed in 1662.

Van Gogh (*vān gōk'*), VINCENT. *See Gogh, Vincent van.*

Vanguard (*vān'gärd*), the popular name for the U.S. earth satellites launched (under the auspices of the International Geophysical Year, *q.v.*) by the Naval Research Laboratory (N.R.L.) and, later, by the National Aeronautics and Space Admin. (*q.v.*). The Vanguard rocket, developed by N.R.L., was the only vehicle specifically designed by the U.S. for the purpose of launching I.G.Y. satellites, and its relatively rapid develop-

ment was a significant achievement of the program. The rocket is 72 ft. long overall and weighs 22,600 lb.; its first stage is a liquid-propellant rocket 45 ft. long and 45 in. in diameter.

After 144 seconds' burning time (or plus 144 sec.), during which it develops 27,000 lb. of thrust, the first stage separates from the second and third stages. The second stage, 21 ft. long, 32 in. in diameter and also a liquid-propellant rocket, contains the guidance mechanism for the entire vehicle. The second stage develops 7,500 lb. of thrust and burns out at plus 261 sec., at an altitude of 128 m. During the 280-sec. coasting period which follows, during which time the vehicle levels out at an altitude of 300 m., the third stage spin-up starts at plus 527.5 sec. The solid-fueled third-stage rocket ignites at plus 541.5 sec. and burns out at 571.5 sec. Then follows a 200-sec. coasting period before the payload separates at plus 772 sec. The empty third-stage rocket casing, which is 60 in. long, 18 in. in diameter, and weighs about 50 lb., also goes into orbit.

Vanguard I, scientifically designated 1958 Beta, was placed in orbit on March 17, 1958. It was a test sphere 6.4 in. in diameter, weighing 3.25 lb. It had an initial perigee of 404 m., an apogee of 2,465 m., and a period of 134.29 min. It was expected to remain in orbit for at least 200 years. The satellite's solar-powered radio transmitter broadcast continuous signals from the time of its launching, enabling scientists to use its well-established course as a landmark in setting guidance systems for other space vehicles. Vanguard II (1959 Alpha) was also a sphere, 20 in. in diameter, weighing 21.5 lb. It was placed in orbit on Feb. 17, 1959, and was instrumented to obtain data on the cloud cover of the earth. Its initial perigee was 347 m., apogee 2,065 m., and period 125.85 min. *See also Astronautics; Earth Satellite; Explorer.*

Vanilla (*vā-nīl'*), a genus of climbing orchids (*see Orchid*), native to the tropics. Cultivated in Mexico, South America, and the East and West Indies, the species *Vanilla planifolia* is a vine which attaches itself to trees by means of aerial rootlets. It bears fruit after three years and may live about 50 years. In the so-called vanilla bean—a pod, 6 to 9 in. long—a pulp is found in which are imbedded many oily seeds. The pods are harvested before they are ripe, are dried slowly, and then fermented. The pulp, converted to vanilla concentrate, is the source of commercial vanilla flavorings. A solution of this concentrate in alcohol, water, and sugar syrup makes up pure vanilla extract. Vanillin, the aromatic constituent of the vanilla bean, may also be derived from other sources; the resulting artificial vanillin is used as is natural vanillin.

Vanity Fair (*vān'ī-tī fār*), a novel by William Makepeace Thackeray (*q.v.*), published in



Official Netherlands Photo

HENDRIK WILLEM VAN LOON

1848, providing a vivid description of English life in the early 19th century, *i.e.*, the period of the Napoleonic wars.

Van Loon (*vān lōn'*), HENDRIK WILLEM, journalist, lecturer, and writer, born at Rotterdam, Holland, Jan. 14, 1882; died at Old Greenwich, Conn., Mar. 11, 1944. Brought to the U.S. as a child, he later became a newspaper man. As a foreign correspondent during World War I, he reported the siege of Antwerp for the Associated Press. In 1915-16, he became a lecturer on contemporary European history at Cornell Univ. and then professor of history at Antioch Coll. His lectures and writings won him great popularity. In 1923, he was awarded the John Newberry Medal for "The Story of Mankind" (1921). Others of his highly successful books, also illustrated by the author's distinctive drawings, are "Van Loon's Geography" (1932), "The Arts" (1937), and "Van Loon's Lives" (1942).

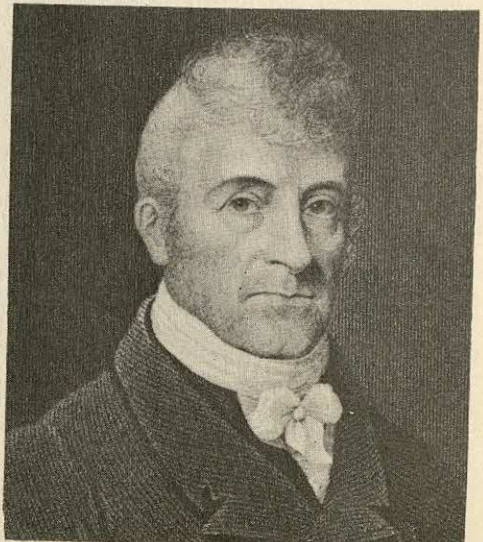
Van Paassen (*pā'sēn*), PIERRE (PIETER ANTONIE LAURUSSE VAN PAASSEN), author and journalist, born in Gorcum, Holland, Feb. 7, 1895. The descendant of a line of Protestant clergymen, he was educated in Rotterdam, Toronto, and Paris. He served as a missionary among the Ruthenians in Canada and as a volunteer with the Canadian forces during World War I. Thereafter, he wrote for the *Atlanta Constitution*, the *New York Evening World*, and the *Toronto Star*. His journalistic duties carried him frequently to Europe, Asia, and Africa during the period between the two wars. His extensive observation of humanity—philosophical, political, and religious—has led to the publication of such books as "Israel and the Vision of Humanity" (1932), "The Deep Red Banner of the Cross" (1937), "Days of Our Years" (1939), "That Day Alone"

(1941), "The Time Is Now" (1941), and "Earth Could Be Fair" (1946). Van Paassen was ordained as a Unitarian minister in 1946. Although he has sometimes been described as sensational, inaccurate, and credulous in regard to supernatural matters, the strength of his spiritual convictions and his uncompromising opposition to the growth of Fascism have undoubtedly made a deep impression on contemporary thought.

Van Rensselaer (*vān rēn'sē-lēr*), STEPHEN, known as "the last patroon," an American statesman, born in New York City, Nov. 1, 1764; died at Albany, N.Y., Jan. 26, 1839. He was descended from the distinguished Dutch family bearing his name. The first of the family connected with American history was *Killian van Rensselaer* (1595-1644), who acquired a vast estate near Albany, N.Y., now including three entire counties. Stephen Van Rensselaer was educated at Harvard Univ. and married a daughter of Gen. Philip Schuyler in 1783. After improving his estate, he engaged in politics as a Federalist and from 1791-95 was a member of the New York senate. He was a lieutenant governor from 1795 until 1801 and served as a member of the New York assembly a second time from 1808-10. In 1812 he was appointed to command the U.S. Army as major general, but, his recruits being inexperienced, met defeat at Queenston Heights (*q.v.*).

He was a canal commissioner from 1816-39 and as such was instrumental in making the construction of the Erie and Champlain Canals a reality. In 1819 he was made regent of the Univ. of New York and afterward became its chancellor. To obtain accurate information about the state, he employed surveyors to make a geological survey,

STEPHEN VAN RENSSELAER



paying the expenses from his private funds. From 1823-29 he represented New York in the U.S. Congress and in 1824 founded the Rensselaer Polytechnic Inst., an institution for teaching theoretical and practical science, at Troy, N.Y.

Van't Hoff (*vānt hōf'*), JACOBUS HENDRICUS, chemist, born in Rotterdam, Holland, Aug. 30, 1852; died in Berlin, Mar. 1, 1911. Van't Hoff was the recipient of the first Nobel Prize in chemistry (1901) and is known for his work in three fields of chemistry. First interested in the structural formulae in space, he founded the study of space chemistry known as stereochemistry. He then did research in the application of thermodynamics to the problems of chemistry which led to his discovery of the laws of chemical dynamics. His third important contribution was the establishment of the laws of osmotic pressure in solutions. Van't Hoff's important works include "Arrangement of Atoms in Space" (1874).

Van Wert (*vān wērt'*), county seat of Van Wert County, Ohio, 76 m. s.w. of Toledo, on the Pennsylvania and other railroads. It is in a farming area. Manufactures include machinery, work clothing, fiber drums, cheese, motor seals, and cigars. Settled in 1835, Van Wert was incorporated in 1848. Population, 1950, 10,364.

Vapor (*vā'pēr*). See *Evaporation*.

Vapor Lamp (*lāmp*), an electric lamp consisting of a glass tube or chamber, exhausted of air but containing mercury and mercury vapor. Illumination is produced by passing through the vapor an electric current admitted by electrodes sealed into the walls. The principle is the same as that of the neon lamp (*q.v.*).

Vargas (*vār'gās*), GETÚLIO DORNELLES, statesman, born in São Borja, Brazil, April 19, 1883; died in Rio de Janeiro, Aug. 24, 1954. Educated at Porto Alegre Faculty of Law, he practiced law and became important in the Republican party, serving as a member of the state congress of Rio Grande do Sul and in 1923 as deputy from that state to the Federal Congress. In 1926 he was minister of finance and from 1927-30 was president of his home state. Leading the Liberal opposition against Julio Prestes, the administration candidate, in 1930, he took over the government, although he had been defeated in the election, and a few months later was named president. In 1934 he promulgated a new constitution and was elected president for a four-year term, but in 1937 he revoked the constitution of 1934, promulgated a new constitution and continued as president until 1945. In that year, declaring that he would not run for re-election, he set the date for new elections, but the army, fearing that the elections would never be held, demanded his resignation and he stepped down from the presidency in October. In the December elections the candidate he backed was elected

and he was named senator from Rio Grande do Sul. In 1950 he was re-elected to the presidency. His administration encountered difficulties in 1954 and was faced with pressure for Vargas' resignation. He agreed to take a "leave of absence" (Aug. 24) and shot himself that day.

Variable (*vār'i-ā-b'l*), a term used in mathematics to represent a quantity which may assume different values in a discussion.

Variable Star, a star whose brightness fluctuates. The most striking case of such a variation is the phenomenon of a *new star* or *nova* (*q.v.*). But many stars change in a less spectacular manner. The first star that was noticed to vary is Omicron Ceti. It was discovered in August 1596 by Fabricius and designated as *Mira Ceti*, "the wonderful star in the Whale." Since then a great many others have been found, especially after photography was applied to the study of the sky and gave permanent records of the past behavior of the stars. The list of known variables has now passed the 5,000 mark. The majority of these fluctuate periodically; others vary in an irregular way. Among the former we distinguish: (a) *Eclipsing variables*, the best known of which is *Algol*. These are close pairs of stars, revolving around their common center of gravity in a plane that is nearly in line with us. The apparent variation of light is caused in this case by one star passing in front of the other and eclipsing it partially or totally. The apparent variation is purely geometrical and covers only a small proportion of the time separating the recurrences, which take place with clocklike regularity. (b) The numerous *variables of short period* ranging from a few hours to two months. These are single stars which actually change in brilliancy through fluctuations in their surface layers. (c) *The variables of long period*, which brighten up and fade at intervals of from four or five months to two years.

Variation (*vār'i-ā'shūn*), the result of qualitative or quantitative change or deviation from a particular situation or condition which is arbitrarily selected as a standard. This term is employed to describe specific circumstances peculiar to a wide variety of subjects, such as biology, geology, chemistry, physics, astronomy, music, engineering, grammar, and mathematics. The term receives its widest usage in biology, where many types of variation are recognized. All organisms are characterized by variation in time and space, within the life span of the individual, between individuals of identical categories, and between different groups. Thus they may exhibit periodic or cyclical variations, such as diurnal, seasonal, or annual variations. Ontogenetic variation describes the change that takes place within the life of one individual. Photogenetic variation describes the differences existing between an

ancestral organism and any of its descendants or between closely related organisms. Environmental variation denotes deviation resulting from the influence of the elements of the environment upon the organism or change in the elements of the environment themselves. Geographical variation refers to the changes occurring in an organism at different locations over an extended geographic area. Genetic variation indicates changes in the hereditary mechanism of an organism. Physiological variation and morphological variation denote changes or modifications in the physiological and morphological make-up of an organism. These are illustrations of variations in the field of biology. Many other types can be found in the infinite variability of nature.

Varicose Veins (*vâr'î-kôs vânz*), veins of increased length, diameter, and thickness of the vessel walls, becoming, as the condition progresses, tortuous, knotted, sacculated, thin-walled and fragile. Such diseased veins sometimes rupture and produce hemorrhages, evidenced by discoloration, swelling, and tenderness of the skin in the affected areas. In such areas there occasionally develop indolent or slow-healing sores called varicose ulcers. Sometimes thrombophlebitis develops as a complication of varicose veins (see *Phlebitis*). The common sites of varicose veins are the lower extremities, also the rectum (hemorrhoids), vulva, and spermatic cord and scrotum (varicocele). Many circulatory impediments such as weak heart valves, pressure caused by pregnancy, tumors, tight garters and corsets, and occupations requiring constant long standing contribute to the development of varicose veins; however, the mechanism of their formation is not thoroughly understood. They may occur at any age beyond childhood but are most common in elderly people and in women after one or more pregnancies. Temporary relief is obtained by resting with the legs elevated and by wearing elastic stockings or bandages on the affected extremities. Varicocele and hemorrhoids are treated successfully by surgery. Severe varicosities of the extremities are treated by a number of methods, including injection of sclerosing solutions which harden and gradually shrink the vessel, ligation (cutting and tying off), and sometimes partial removal of the larger channels by a process called "stripping." Varicosities should not be long neglected because of the danger of phlebitis and other diseases.

Variety (*vâ-rî'e-tî*), a term used primarily in biology and applied to an individual or small group of organisms that are similar to one another and that are distinguished from typical individuals in minor characteristics. The word was used formerly to distinguish such variant individuals from the remainder of the species or subspecies by placing them in a distinct category

that was called a variety. The term has been used in a loose fashion and has had no definable restricted application. Because of its vague meaning, it is no longer used by modern biologists to distinguish infraspecific categories. It is used occasionally in a broad sense to denote variant individuals without designating any particular category of classification.

Variety Show, a form of theatrical entertainment, usually consisting of songs, dances, and specialty acts. See also *Vaudeville*.

Varna (*vâr'nâ*), renamed (1949) STALIN, a seaport and summer resort in Bulgaria, on the Black Sea, ca. 160 m. n.w. of Istanbul, Turkey. The eastern terminus of the Bulgarian railway, Varna exports grain, cattle, and hides. Its manufactures include textiles, flour, chemicals, and tobacco products. Varna was the site (1444) of a decisive defeat of an army of Crusaders by the Turks under Murad II. Population, ca. 75,000.

Varnish (*vâr'nîsh*), a resinous solution of gums or resins, by themselves or in combination with drying oils. Those without drying oils are called spirit varnishes, and those with them are called oleoresinous varnishes. (1) *Spirit varnishes* consist of semihard, or soft, resins dissolved in a volatile solvent, usually alcohol. On application, they dry entirely by evaporation, leaving a film of the original resin. This is lustrous and hard but is friable and generally lacks toughness and flexibility. Shellac and dammar are the most common resins for spirit varnishes. (2) *Oil, or oleoresinous, varnishes* consist of a hard resin, or resins, combined with drying oil and a drier, thinned with a volatile solvent. On application, they first become tacky by the evaporation of the solvent and then dry by oxidation of the oil, forming a film which is tough and elastic and is not affected by the original solvent. Their characteristics are dependent upon the nature and proportions of the oils and resins used. The oils are generally linseed, soybean, China wood (tung), or hydrogenated castor oil. The resins used are mostly synthetics, such as phenol-formaldehyde, coumarone, or esters of rosin (ester gum); for the cheaper types of oil varnishes, natural resins, such as rosin, copal, dammar, congo, and kauri are used.

Baking varnishes are the oil type, without the drier, and are used for industrial purposes, such as metal decorating, steel furniture, etc. Air-drying varnishes, another oil type, are used for cabinets, floors, furniture, signs, etc.

Varro (*vâr'ô*), MARCUS TERENCE, Roman scholar and writer, born in 116 B.C. at Reate; died in 27 B.C. After a long career in Roman government, he followed his friend Pompey (q.v.) in 67 B.C. as legate and commanded the navy. Since he stayed with Pompey until 49 B.C., he had finally to surrender to Caesar (q.v.), who, however,

pardoned him. After some political wavering, he was outlawed by Mark Antony. Eventually he was allowed to return to Rome.

Varro is among the few men who have been able to embody the whole knowledge of their period and to work in widely divergent fields—as did, later on, Leonardo da Vinci (*q.v.*) and Wolfgang von Goethe (*q.v.*). He wrote more than 70 books. Among those which have survived, though incomplete, the following are most important: “*Scriptores rei rusticae*,” a work on agriculture; some volumes of his “*De lingua latina*,” a kind of history of Roman literature and research about the origin of the Latin language, and “*Antiquitates rerum humanorum et divinarum*,” which gives the political and religious history of Rome from its beginning. Varro’s universal knowledge is also shown in a kind of encyclopedia, the “*Disciplinae*,” in which he deals with all fields of mathematics, music, logic, grammar, architecture, medicine, etc. He also wrote biographies of Roman and Greek famous men, and poetry. Varro should not be confused with Publius Terentius Varro, a contemporary Roman poet (82-37 B.C.) of lesser importance.

Varus (*vā'rus*), PUBLIUS QUINTILUS, Roman general, celebrated for his part in the campaigns against the Germans. He became consul of Syria in 13 B.C. and afterward was made its governor. In 7 A.D. he was sent by Augustus as governor to the territory between the Elbe and the Rhine, after that section had been conquered by Drusus and Tiberius. An insurrection was organized in the year 9 A.D., under the leadership of Arminius, and the Romans were totally defeated in the forests of Teutoburg. Varus ended his life by committing suicide. This defeat turned the tide of Roman conquest and the Romans were never able to reconquer the region.

Vasari (*vā-zā'ri*), GIORGIO, painter, architect, art historian, born in Arezzo, July 30, 1511; died in Florence, June 27, 1574. He entered the service of the Medicis and lived in Florence and Rome. A pupil of Bandinelli and Rosso, and influenced by Michelangelo, he painted frescoes in the Palazzo Vecchio and in the Cathedral of Florence, and in the Scala Regia in Rome (Vatican). He was also the architect of the Uffizi in Florence. But his fame rests on his book, “*Vite de' più eccellenti pittori, scultori et architetti italiani*” (1550), known as “*Lives of the Painters*,” a collection of biographies of Italian artists from Cimabue to Michelangelo, one of the most important works of the history of art, even in our times.

Vascular System (*vās'kū-lēr sý'stəm*), in anatomy and physiology, the system of vessels in the human body which provides the flow of blood and lymphatic fluids.

Vase (*vās*), a vessel of an ornamental charac-

ter, usually made of pottery, but sometimes of glass, stone, or metal. Vases were used extensively among the people of ancient times and throughout the ages have had very artistic forms. Many ornamental designs have come down to us from the Greeks, Etruscans and Romans. Throughout the Middle Ages vases of beautiful form and artistic designs were produced in Europe, and many of these products are seen in the museums and other art collections. China and Japan take high rank in the production of these vessels in modern times, many of which are made of porcelain, usually colored and finely glazed. Artistic vessels of a high class are now made in many countries of Europe and America, the designs and workmanship comparing favorably with the better styles of Grecian vases. See also *Portland Vase*; *Pottery*.

Vaseline (*vās'ē-lēn*), a trade name (which usage has made a common noun) for a substance obtained in the purification of crude petroleum, consisting essentially of a mixture of paraffines; also known as *petrolatum* or *petroleum jelly*. It is yellowish, translucent, and nearly odorless and tasteless. The chief uses of this product are in the arts, especially as a base in making pomade, ointment, and cold cream. It has considerable value as a lubricant and as a coating to protect steel surfaces and instruments from rust.

Vase Painting (*vās pānt'ing*), the decoration with patterns and colors of the surfaces of vases, *i.e.*, pieces of pottery which have no lids and are generally (though not always) taller than they are wide. They were usually made of clay, dried in the air, and in relatively early times baked. Later they were glazed. Vases were made and painted, sometimes with great technical skill and beauty, in prehistoric times, even before the introduction of the potter's wheel.

The development of pottery was almost identical with all prehistoric and primitive peoples. Modern research has proved that parallel developments have taken place in different countries with different cultures at different times. Babylonia and Assyria, Egypt and Persia, the Far East and Central and South America, all of them have their own history of vase painting, reflecting complex developments of technical skills as well as of artistic styles.

It is, however, primarily Greek vases that are mainly called to mind by the term vase painting. Since no civilization's works of art can be called artistically superior or inferior to those of another, the reason for giving Greek vases primary consideration is not that they are better or more beautiful than any others; it is rather the historical reason that Greek painting developed essentially as vase painting rather than as mural or easel painting. Thus, Greek vase painting is almost identical with Greek painting generally,



GREEK VASES, 6th CENTURY B. C.

(from left to right)

Amphora with geometrical designs; red-figured vase; black-figured amphora

especially since what Greek murals there were have been lost.

Primitive neolithic pottery already used various colors, making red with a solution of red clay, black with one of iron oxide. Egyptian and Cretan vase painting had a long history. Greek vase painting, although to a certain extent stimulated by that of the Cretans, with its natural and at the same time decorative style, is essentially independent and original. The Greeks, for example, inherited the older form of depicting the third dimension not by perspective but by overlapping of forms, and by simply painting a figure which was supposed to be behind another higher than the other. It was only in the 6th century B.C. that the Greek vase painters began slowly to explore the rendering of depth in painting and ceased to confine themselves to representing full-front bodies with attached profile heads and legs. For a time, attempts at perspectival drawings were combined with the older form of front-profile representation. Until about 530 B.C., the Greek vases were black figured, i.e., scenes were outlined in black on the red clay background. After 530, red-figured vases begin to appear. On these, the background was painted black, while the figures themselves showed the original uncovered red clay. Details were painted in with black lines. From 530 until late in the following century black-figured and red-figured vases paralleled each other, but finally red-figured vases superseded the black altogether. The human figure began to be shown not only in front and profile

but also in three-quarter views, some foreshortening began to be visible, and the draperies were no longer stiff but fell naturally. Perspective actually began to come into its own and new colors were added to red and black. At the end of the 5th century, perspective in the modern sense became general and in the 4th century, Greek vase painting became truly realistic. In the Hellenistic period (see *Hellenism*), decoration became richer and more manifold. Painters were attempting to recreate space on the surface of the vessel, although perspective never achieved its modern quality. Modeling in light and shade played a greater role. About this time, however, murals—and, in the Roman Hellenistic time, mosaics—began to play a larger part and vase painting was no longer important. As time went on, the purity of craftsmanship was gradually lost.

The development of Etruscan painting, of so-called Arretine ware, of Roman vase painting, of Persian, Syrian, and Turkish vase painting, of medieval and Renaissance painting, is not conceivable without the influence of Greek vase painting, although each of these developments produced works of art of entirely different character.

See also *China; Chinaware; Pottery*.

Vasilevsky (*vās-ī-lēf'skī*), ALEXANDER MIKHAILOVICH, army officer, born in Russia in 1895(?). Vasilevsky's military career began with World War I; he joined the Communists during the Russian Revolution. After serving in the Russo-Finnish war, he was deputy chief of staff

of the Soviet army (1941-42). Made a general in 1942 and a marshal in 1943, Vasilevsky was prominent in the recapture of Stalingrad and of Sebastopol and in the capture of Königsberg, East Prussia, before he commanded the Soviet troops in Manchuria in 1945. He returned to the U.S.S.R. in 1946 and was the first chief of staff of the unified armed forces (1946-49). He was made minister of the armed forces in 1949; with the reparation of the services in 1950, he became minister of the army, serving until 1953.

Vasomotor Nerves (*vās-ō-mō'tēr nērvez*), in anatomy, those nerves which regulate the blood vessels. The *vasoconstrictor* nerves cause contraction while the *vasodilator* nerves cause dilation of the blood vessels.

Vassar (*vās'ēr*), MATTHEW, philanthropist, founder of Vassar Coll., born in Norfolk, England, Apr. 29, 1792; died in Poughkeepsie, N.Y., June 23, 1868. He accompanied his father, James Vassar, a French Protestant, to America in 1796; the family settled on a farm near Poughkeepsie, N.Y. His father established a brewery in Poughkeepsie in 1801, which Matthew Vassar later inherited. From the fortune derived from brewing ale, Matthew donated \$400,000 to the founding (1861) of a school for the higher education of women, which became known as Vassar Coll. (*q.v.*). He increased this gift by his will to about \$800,000.

Vassar College, a college for women at Poughkeepsie, N.Y., founded by Matthew Vassar, formally opened in 1865. It was the first women's college comparable to the best men's colleges of the day. It has a faculty of 200, and more than 1,300 resident women students. After World War II a few male veterans were admitted as an emergency measure.

The college offers a four-year course for the A.B. degree and a year of graduate work for the A.M. degree. Its 32 academic departments range through the natural sciences, the social sciences, the arts, literature, and languages. Special courses include a 6-week summer session, the Family Institute (established in 1926) for parents and children. Parents study materials on all phases of family life; the children go to a special children's school taught by child guidance experts.

The 39 buildings include the Frederick Ferris Thompson Memorial Library, which contains over 250,000 volumes. The college grounds cover 900 acres. Vassar's original \$400,000 endowment has been increased to \$16,000,000.

Vatican City (*vāt'i-kan sīt'y*), the seat of the pontiffs at Rome and the official residence of the Pope. The Vatican of today is an outgrowth of the *Civitas Leonina* which was built by Pope Leo IV (847-855) and which was protected by a wall against the invading Saracens. The *Civitas Leonina* contained chapels, churches,

monasteries, hospitals, and the living quarters of the Pope, which had clustered around the Church of St. Peter since the middle of the 6th century. Part of this original quarter was destroyed during the Middle Ages. After the return of the popes from Avignon (*q.v.*), this whole quarter of Rome was repeatedly enlarged and embellished, especially during the Renaissance. The entire quarter was then the property of the Church and of the Pope, but today the Vatican is confined to an area of 108.7 acres and includes only the papal palace proper, St. Peter's Church and the Piazza di San Pietro (St. Peter's Square), the library and the museums of the Vatican, and the garden of Belvedere. See also *Lateran Treaties*.

More importance is attached to the contents of the buildings than to their architectural effect, though the entire group of structures with their gardens and monuments constitutes a vast aggregation of wealth and artistic beauty, which is a major attraction for tourists visiting Rome.

The Vatican contains a larger number and more immortal works of art than all other museums of Europe together. In architecture, sculpture, painting, applied arts, and monuments of historic and religious importance, the Vatican collection is unsurpassed. Only the most important parts of the Vatican collection are discussed here.

The *Pinacoteca*, founded by Pius VII, who collected there in 1815 all the works of art which Napoleon's troops had looted from Rome, includes works by all the greatest masters of the Renaissance, including Fra Angelico, Leonardo da Vinci, Raphael, Michelangelo, and by less noted artists of the period as well.

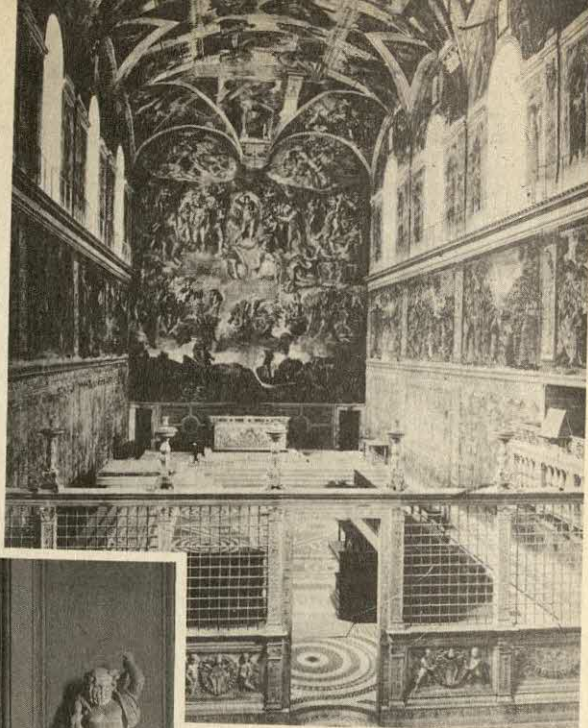
The collection of classical antiquities had already been brought together at the time of the Renaissance and owes its excellence especially to Pope Julius II. It contains the most important collection of Greek and Roman antiquities anywhere in the world, including the torso of the Apollo of Belvedere, the Laocoön, the Zeus of Otricoli, the portrait statue of Pericles, the Sleeping Ariadne, and the Niobes.

The *Museo Chiaramonti*, another special collection of antiquities, includes the famous Bearded Dionysius. In still another collection, the so-called *Braccio Nuovo*, there are statues such as one of Demosthenes, the "Wounded Amazon," the "Doryphorus" by Polyclitus, the "Discobolus" by Myron. Special museums are dedicated to Etruscan and Egyptian art and to Greek vases, and the *Museo Sacro* to Church history.

Still more important collections are kept in special sectors of the apartment of the Pope himself. There is a gallery of tapestries woven after designs by Raphael and, most famous of all, the Sistine Chapel (*q.v.*). The murals in this chapel were executed by the most important painters of the early Renaissance, including Botticelli, Peru-

THE SISTINE CHAPEL

This Vatican chapel is famous for a great work by Michelangelo (1475-1564), the "Last Judgment" (courtesy The Bettmann Archive)



GANYMEDE AND EAGLE

The Candelabra Gallery in the Vatican contains superb sculptures, such as this one of the 4th century B.C. (courtesy Ewing Galloway, N.Y.)

MADONNA WITH FOUR SAINTS

This painting by Pietro Perugino (1446-1523) is one of the masterpieces of art that grace the Vatican Gallery (courtesy Ewing Galloway, N.Y.)





AIR VIEW OF VATICAN CITY

gino, and Ghirlandajo; the ceiling and the wall behind the high altar were painted by Michelangelo. A long row of rooms, the so-called *Stanze*, in the private apartment of the Pope, are decorated with murals by Raphael.

The famous Vatican Library, founded in 1378, has about 250,000 printed volumes, including 2,500 editions dating from the 15th century, and about 26,000 rare manuscripts. This library is in a building erected by Sixtus V in 1588.

The Vatican has been used by the popes as a place of residence since their return from Avignon in the latter part of the 14th century, and new popes are elected by the conclaves that meet here. It has been the only papal residence since 1860. Vatican State (established in 1929) is governed by the Supreme Pontiff assisted by the various Sacred Congregations, offices, and tribunals of the Roman Curia, or Papal Court. Vatican City owns its private radio station, the gift of Marconi in 1931, railroad and postal facilities, and mints its own coinage. Though not acting as a regular political power, the City-State exercises a great indirect influence in temporal matters of all countries. Population, *ca.* 1,000.

Vatican Council. See *Ecumenical Council*.

Vattel (*fät'el*), EMERICH DE, jurist, born in Couvet, Switzerland, Aug. 25, 1714; died there, Dec. 20, 1767. He was the Saxon ambassador in Bern, 1746-58, and is known for his book "Law of Nations" (1758), which describes the principle of the balance of power among states as a controlling factor in international relations.

Vaucluse (*vō-klüz'*), a department in south-

eastern France, bounded on the n. by Drôme, e. by Basses-Alpes, s. by the Durance River, and w. by the Rhone River. It is a leading agricultural area, noted for its wines and fruits. Olive and mulberry trees are cultivated, as are tobacco, millet, and lavender. Fruits and vegetables are processed, and chemicals, paper, silk, and pottery are produced. The area is popular with tourists, especially Avignon. Area, 1,381 sq. m. Population, 1954, 268,318.

Vaud (*vō*), canton in western Switzerland, bounded on the n. by Neuchâtel, the Lake of Neuchâtel, and Fribourg; e. by Fribourg and Bern; s. by Valais, the Lake of Geneva, and Geneva; and w. and n.w. by France. Agriculture, stock raising, and wine production are carried on, as are metal- and woodworking, printing, and watchmaking. The people are chiefly French speaking and Protestant. The area was conquered by the Romans (A.D. 58) and passed to the Burgundians (5th century) and the Franks (A.D. 534). It became a canton of the Swiss Confederation in 1803. Area 1,239 sq. m. Population, 1960, 430,200.

Vaudeville (*vōd'vil*), the name applied to a kind of dramatic entertainment, so called from the *Vaux de Vire*, the name of two valleys in Normandy. Oliver Basselin (who flourished in the 15th century) wrote a number of satirical songs relating to current events which he named *vaudeville*, and this term has continued to be applied to light plays that are interspersed with dancing and comic acting. In general, vaudeville is a series of acting and singing sketches or "skits." However, the different numbers are not closely related

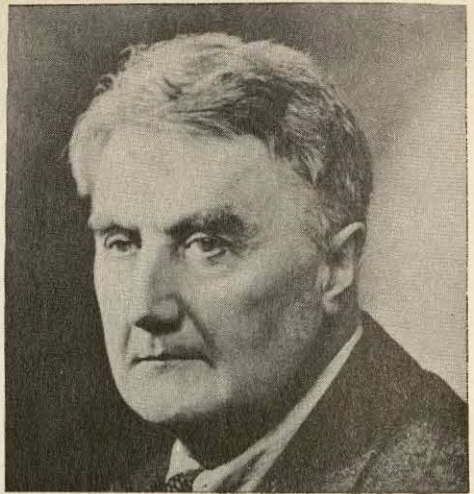
VAUGHAN

in style or subject but may vary widely in nature.

Vaughan (*vən*), HENRY, poet, born near Scethrog by Usk, Wales, April 17, 1622; died there, April 23, 1695. Vaughan studied law and then medicine in London and finally settled permanently in South Wales, where he practiced as a physician. He was known as "the Silurist" because of his devotion to the region of his birthplace, which was originally inhabited by the Silures. A mystic and religious poet, he is best known for his poem "The Retreat," which anticipates Wordsworth's "Ode on Intimations of Immortality." Vaughan, in the past, was not highly regarded, but modern critics consider him one of the best followers of the Welsh poet George Herbert (*q.v.*). Among Vaughan's published verses are "Poems" (1646), "*Silex Scintillans*" (1650, 1655), "*Olor Iscanus*" (1651), and "*Thalia Rediviva*" (1678); the last-mentioned book includes some poems by his brother, the alchemist Thomas Vaughan.

Vaughan, HERBERT, prelate, born in Gloucester, England, April 15, 1832; died in Mill Hill, England, June 19, 1903. After studying at Stonyhurst Coll., he attended a Benedictine school in England and then continued his religious education on the Continent. He was ordained a priest in 1854 and soon after returned to England. Later, he founded St. Joseph's Foreign Missionary Coll., in Mill Hill Park, England, with the help of donations solicited during a trip to the U.S. in 1863. He was made bishop of Salford in 1872, archbishop of Westminster in 1892, and cardinal in 1893. Vaughan wielded wide influence as head of the Roman Catholic Church in England, and he is considered to be primarily responsible for the passage of the Education Act of 1902 whereby denominational schools became state-financed.

Vaughan Williams (*vən wīl'yəmz*), RALPH, composer, born in Down Ampney, England, Oct. 12, 1872; died in London, England, Aug. 26, 1958. After receiving his musical education at Cambridge Univ. and the Royal Coll. of Music, he continued his studies with Max Bruch in Germany (1897-98) and, more informally, with Maurice Ravel in France (1909). Accordingly, his compositions often reflect French impressionist trends. During his long career as a composer (he wrote "*Sinfonia Antartica*" at the age of 81), he produced nine symphonies, stage and choral works, concertos, chamber music, and songs. Among his varied compositions are the opera "Hugh the Drover" (1911-14), "A London Symphony" (1914, revised in 1920), the oratorio "*Sancta Civitas*" (1926), and the "Concerto, piano and orchestra" (1933). His compositions are characterized by folklike melodies, strong rhythmic patterns, and frequent use of modal harmonic progressions.



British Official Photo

RALPH VAUGHAN WILLIAMS

Vault (*vəlt*), an extended arch, or an arched roof, so constructed that the stones, brick, or other materials composing it sustain each other and support a weight, as in a bridge or building. The art of vaulting was practiced by the Egyptians, who constructed the semicircular arch, a form of vault extending from one end of an apartment to the other, which is still employed for various purposes. Vaults of this kind were common among the Romans, but in later years they added groined vaulting, that is, structures formed by two vaults intersecting at right angles. Groined vaulting was utilized extensively in bridging streams during the Middle Ages and later in various forms of religious architecture. The names now applied to different kinds of vaults include semicircular or cylindrical, groined, Gothic, and diagonal. A *surmounted vault* is one having a height greater than half its span and a *surbased*, less than half its span. Modern architecture presents many fine specimens of vaulting, but steel and iron are fast superseding both arches and vaults, especially in bridges, roofs, floors, and other parts of buildings.

The term also means a burial chamber, or place of interment or storage. A bank vault, or safe (*q.v.*) deposit vault, is substantially similar, but constructed on a smaller scale to protect valuable documents, money, or jewelry.

Vauxhall (*vəks'həl*), the name of a public garden in London, which was famous as a public resort for two centuries after the restoration in 1660. It occupied a place in Lambeth, near the manor or landed estate called Faulke's Hall, whence its name. The visitors at Vauxhall spent their time in various pastimes, largely of a loose character, thus causing the place to be mentioned by a number of novelists and dramatists. Thackeray's "Vanity Fair" makes frequent allusions

to it. The garden was closed in 1859, and its site was rapidly built over.

Ve-Adar (*vē'ā-dār*), a month in the Jewish calendar which is added to the normal Jewish year every 3rd, 6th, 8th, 11th, 14th, 17th and 19th years of a 19-year cycle. The purpose of adding this month, also called *Adar sheni* (2nd Adar), is to make up the discrepancy between the solar year and the Jewish year.

Veblen (*vēb'lēn*), THORSTEIN B., economist, author, and teacher, born July 30, 1857, at Cato, Wis.; died Aug. 3, 1929, at Menlo Park, Cal. He studied at Johns Hopkins, Yale, and Cornell Univs., was appointed reader in political economics at the Univ. of Chicago in 1893, where he became an assistant professor. In 1906 he joined the faculty of Stanford Univ. as associate professor (till 1909). After that time he lectured on economics at the Univ. of Missouri (1911-18), becoming a member of the faculty of the New School for Social Research in 1918, where he taught until his death. From 1896-1905 he was managing editor of the *Journal of Political Economy*. Besides his numerous contributions to periodicals, his main works include: "The Theory of the Leisure Class" (1899), "The Theory of Business Enterprise" (1904), "The Instinct of Workmanship" (1914), "Imperial Germany and the Industrial Revolution" (1915), "The Higher Learning in America" (1918), "The Engineers and the Price System" (1921), and "Absentee Ownership and Business Enterprise in Recent Times" (1923).

Veblen's approach toward his science was original, as he carried his thinking far beyond mere economic problems. Beyond Karl Marx (*q.v.*) he understood the influence of economic factors not only upon the social status of individuals and

groups, but also upon their psychology. His two works discussing these questions are "The Theory of the Leisure Class" and "The Theory of Business Enterprise." In both books he combined the analysis of economic factors with the effects of these factors upon the thinking, the emotional development and, indirectly, upon the sociological structure of certain classes of modern society. His influence as a teacher can still be felt today.

Vedanta (*vā'dān'tā*), the most popular of the six tradition systems of Indian philosophy. As a living tradition it represents a condensation of the philosophy of the Vedas (*q.v.*). The name means the "aim of the Vedas," and Vedanta is built upon the content of the Vedas. The philosophy is not only elucidated but also exemplified in the lives of its great followers, and therefore it is not at all academic. And as a philosophy it is based less on specific creeds and dogmas than on individual religious experiences. The aim of the Vedanta system is the same as that of all Indian philosophies and religion: to liberate the individual from the pain of reincarnation (*q.v.*). The means to achieving this are, in the Vedanta system, not sacrifices or ceremonial rites but merely of spiritual nature—primarily the study and the deeper understanding of the Vedas.

The only possible liberation and source of eternal bliss is the understanding of the one real existence, of Brahman. Our so-called reality, the phenomenal world, is a mere illusion, and the Vedanta system helps one to become conscious of this fact. If we actually understand and experience our identity with Brahman, we will not be born again and need not go again through the pain of earthly existence. Samsara, the "wheel of life," is avoided, the eternal circle of birth and rebirth is interrupted, and Moksha, salvation, is achieved. Logically, individual existence is also fictitious, an illusion, and the human being who studies the Vedanta system successfully learns that he is "*tāt*," meaning that he is united with Brahman, and that after the end of his earthly existence he will return immediately into Brahman, without being reborn.

Thus actually the Vedanta system can be understood as a pure monism, even as a kind of monotheism, differing from the monotheistic ideas of the Western civilizations only by a different concept of the individual. There are many shades of its interpretation. Shankara, an Indian philosopher ca. 800 A.D. recognizes Brahma as a personal deity; for him salvation lies also in the consciousness of one's identity with Brahman. A later Indian philosopher, Ramanuja, ca. 1100, articulates the monism even more precisely, but believes in the reality of individual souls, etc.

Most interesting is the invasion of the Vedanta system into modern Western civilization. Rama-Krishna, Vivekananda, and other Indians have

THORSTEIN VEBLEN



done much for its spreading in the U.S. and Europe; some of the foremost English writers, like Gerald Heard, Aldous Huxley, and Christopher Isherwood belong to the followers of the Vedanta system.

Vedas (*vā'dāx*), meaning "inspired knowledge," the name of the sacred scriptures of the Brahmins. They are considered "*śruti*," which means directly revealed by the deity. They represent, if not absolutely the earliest system of philosophy, certainly one of the earliest. There are no doubts that all of them originated in the 2nd millennium B.C., elements of them perhaps even earlier. The hymns which they contain were created before the arrival of the Aryans (*q.v.*) in India, and for that reason they differ decisively from most of the early Indian literature written in Sanskrit.

These writings are divided into four works or books, according to the time in which they were written, and include the *Rig-Veda*, *Yajur-Veda*, *Sāma-Veda*, and *Atharva-Veda*. All are held to be divinely inspired.

The *Rig-Veda* is the oldest of the Vedas. All the others depend on it to a certain degree. It contains 1,017 hymns and 10,580 verses and it is subdivided into 10 mandalas dedicated to the various gods. Many inferences about historical and social conditions of early India can be drawn from it. The *Sāma-Veda* is an anthology of 1,810 verses, partially in connection with *Rig-Veda*. The next is the *Yajur-Veda*, and the last the *Atharva-Veda* of 20 books with 766 hymns and 6,000 verses, partially taken over from the earlier Vedas; part of this consists of conjurations, curses, proverbs, etc. In all probability, the last parts were written not later than the 6th century B.C. The fact that identical ideas and sometimes even identical formulations from earlier books are taken up so often in later parts of the Vedas may be explained by the fact that they served to clarify the original teachings. This relationship could be compared with the four Gospels in the New Testament.

Trayi is a title used to describe the first three, the term meaning threefold. Since the Vedas vary greatly in time and authorship, they represent a general evolution of thought and worship from the simpler forms to the more thoughtful and reflective. The general tenor of the hymns which accompanied the act of sacrifice as contained in the Vedas proved that the idea of salvation then was a rather materialistic one, concerning mainly physical life.

There are certain rites for reciting and writing down the individual verses of the Vedas, with reference to the most minute details. The later the parts of the Veda are, the more complex become the individual rites.

Each Veda is divided into three parts: the San-

hita, the Brahmana, and the Jnana or Upanishads. The *Sanhita* is a collection of hymns and prayers called *ganas* or *mantras*, part of them being very old. The *Brahmana* relates to rituals, describing how certain chants shall be connected with the act of sacrifice by analyzing the respective verses. They are the best source for the original rites, legends, and dogmas; these were written during the transitional period from the Vedic to the Brahman concept (see *Brahma*). The philosophical system is most clearly explained in the part of the Brahmana which is called the *Upanishad*. The *Sutra* part of the Brahmanas contains descriptions of various rituals, commentaries, explanations of words, etc. They are on the whole rather hard to understand, since many philosophical and magic formulas are somewhat enigmatic.

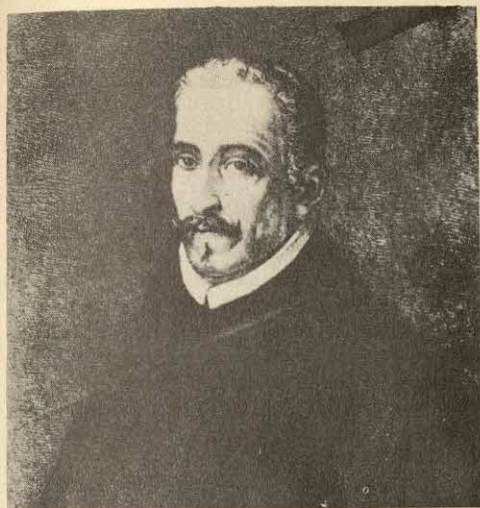
Monotheism, the doctrine that there is but one God, is the basic teaching of the Vedas, but a form of polytheism, the belief that there are more gods than one, is indicated.

Veddās (*vēd'āz*), or VEDDAHS, a native race of Ceylon, occupying the eastern part of the island. They are a remnant of a primitive type of mankind and are small in stature, rarely more than 5 ft. 2 in. tall. The men are skilled archers and spend much of the time in hunting and fishing. Their dwellings are primitive and the government is patriarchal. This race differs from the Singhalese, who constitute the predominating people of Ceylon. Intercourse between the two is very limited. The Veddas number *ca.* 2,200.

Vedder (*vēd'ēr*), ELIHU, painter, born in New York City, Feb. 26, 1836; died Jan. 29, 1923. After studying painting in New York, he studied successively at Paris and in Italy, and after five years spent in his native land, settled in Rome, Italy, in 1866. The year before, he was elected a member of the National Acad. His skill as a genre painter, preferring topics of a somewhat mystic, idealistic quality, is high. Among his best works are: "Death of Abel," "Monk Upon the Gloomy Path," "A Dancing Girl of Venice," "Lair of the Sea Serpent," and "Arab Listening to the Sphinx." His Italian studies of the old masters are reflected in so far as he strives for a simplicity in connection with a classic feeling. He also strengthened his reputation through the illustrations for Omar Khayyam's "Rubaiyāt," which are a perfect pictorial commentary on this book of poems.

Vega (*vē'gā*), the brightest star in the Northern Hemisphere, in the constellation of Lyra. Its distance is 27 light-years.

Vega Carpio (*vā'gā kār'pō*), LOPE FÉLIX DE, dramatist and poet, born in Madrid, Spain, Nov. 25, 1562; died Aug. 27, 1635. Today recognized as the founder of the Spanish national drama, Vega began his literary work at the age of 12, although it was not until the turn of the century that he achieved national distinction as a play-



LOPE DE VEGA CARPIO

wright. A quick thinker, with a vivid imagination, he turned out plays at an amazing rate. His own records state that on more than 100 occasions he wrote new plays and had them on the boards within 24 hours. Although his fame rests chiefly on his dramatic and poetical works, he left a quantity of interesting prose. He used almost every known form in both poetry and prose. At least 468 comedias and some 50 autos (religious dramas) belong to his authentic repertory, and probably an equal number have been lost. Some authorities believe he may have written as many as 2,200 dramatic pieces. He sought his subject matter everywhere: in novels, history, legend, song, and rustic poetry. Although he was not the first to use the original and purely Spanish creation, the *comedia española*, he gave it new life and form, in which it became the national comedy and remained so for more than 200 years. Among his more noted works are his "New Art of Writing Comedies," "*El Castigo sin Venganza*," "*La Estrella de Sevilla*," "*La Dragoneta*," an epic directed against Sir Francis Drake, and "*La Hermosura de Angélica*," a continuation of the "*Orlando Furioso*" of Ariosto.

Vegetable (*věj'ě-tà-b'l*), anything in the nature of a plant, as distinguished from animal or mineral. In a horticultural sense, any herbaceous plant (not tree or shrub) commonly used for human food, or the edible part of such a plant. Parts used are roots, stems, leaves, flower buds, seed cases, and seeds. Vegetables are usually annuals, with the exception of asparagus and rhubarb. Examples of root vegetables are the beet, carrot, parsnip, radish, salsify, turnip, and sweet potato. Stem vegetables include the white potato (the tubers are not roots, although they grow underground) and asparagus. Leaf vegetables number among them leaf lettuce and spinach. Examples of leaf buds are cabbage, Brussels sprouts,

head lettuce, and the onion. Flower buds include cauliflower and broccoli. Seed cases (with or without seeds) include the cucumber, tomato, eggplant, pepper, melon, squash, corn, and green bean. In the seed group are peas, lentils, lima beans, and dried beans. In a botanical sense, these herbaceous-plant seed cases are *fruits* as well as the tree-, shrub-, and vine-fruits (also developed from seed cases) which the horticulturist recognizes; and the seeds here listed are parts of fruits.

"Vegetable" is not a technical term in botany but is sometimes used to refer to edible plant parts other than fruits. Popularly, a vegetable is a plant or plant part usually eaten with the main course of a meal, as distinguished from a fruit, used for dessert. Melons, horticulturally regarded as vegetables in the U.S., are fruits to the popular mind and to the botanist; rhubarb, a vegetable both horticulturally and botanically, is commonly served as dessert. Squash, in pie, is used as the fruit that it actually is botanically. See also *Agriculture: FOOD AND NUTRITION; Vitamins*.

Vegetarianism (*věj'ě-tár'i-an-iz'm*), the practice or theory of eating only vegetables and fruit. The writings of Plato and others indicate that the idea was known to the ancients, but it did not become a popular idea until the 19th century, when it gained vogue in England and spread to the U.S. The Vegetarian Federal Union was organized in the U.S. in 1889.

There are varying degrees of vegetarianism, some of its adherents excluding from their diets all animal flesh and by-products, such as milk, butter, cheese, and eggs, while others extend their prohibitions to cooked foods and eat only raw foods such as vegetables, fruits, nuts, and grains. In general, vegetarians claim that it is unhealthful to humans to eat animal flesh, and that animals may be disease carriers, that greater land economy can be gained by growing food for human consumption only, that killing animals for their meat develops callousness and lack of an ethical sense, that all nutriment necessary to man is contained in fruits and vegetables, that man's physical construction is not adapted to flesh eating, and that the quality of the human race would be improved by vegetarianism and an allied agricultural program.

Vegetarianism is a tenet of certain religious groups, notably the Hindus and the Seventh-day Adventists. It has been practiced by a variety of well-known persons, including Pythagoras, Mahatma Ghandi, George Bernard Shaw, and Amos Bronson Alcott.

Veii (*vě'yī*), an ancient city in Etruria, and long the rival of early Rome. It was one of the 12 cities of the Etruscan confederation. Most writers assume that Veii occupied the site of Isola Farnese, 12 m. from Rome. A contest for supremacy between Rome and Veii continued under all the

VEIN

Roman kings, until Veii was finally conquered by Camillus in 396 B.C., after a 10-year siege.

Vein (*vân*), in physiology, a membranous tube or canal conveying blood to the heart, after it has been conducted from the heart through the arteries to the different parts of the body. The dark or venous blood is carried by all veins except the pulmonary veins, which conduct oxygenated blood from the lungs to the heart. Their walls are much thinner and less elastic than those of the arteries. They are usually nearer the surface than the arteries, some of them coursing along under the skin, as in the back of the hand, where they may be seen. At their farthest extremity, where they are minute in size, they are formed by the venous capillaries, which receive the blood from the arterial capillaries, and they increase in size and diminish in number as they gradually pour into one another, forming the vena cava ascending and the vena cava descending, which discharge the blood into the right auricle. The *vena cava ascending* is a large vein through which the blood from the lower part of the body is returned to the heart, and the *vena cava descending* is a vein carrying the blood from the head and upper limbs to that organ. The veins form the so-called venous system. Each lobe of the lungs has a pulmonary vein by which the oxygenated blood is returned to the left side of the heart, after being received by them through the pulmonary artery. Among the diseases of the veins are phlebitis, an inflammation of their lining membrane, and varix, a dilatation of the vein structure, which is referred to or closely connected with varicose veins (*q.v.*). The latter are veins in a state of permanent or abnormal distention. See also *Phlebitis*; *Thrombosis*; *Varicose Veins*.

Vein, in geology, a sheetlike mass of minerals occupying or following a fracture or set of fractures in the enclosing rock; formed later than both rock and fractures. Large fracture zones which contain ore are called composite veins or *lodes*. In *mining*, vein and lode are often used synonymously. Ore-bearing veins are formed by deposition from metalliferous solutions permeating upward or from mineral-bearing ground waters moving laterally or downward. In *mining and engineering*, the terms vein and *dike* are often used interchangeably, but, although they have the same geometric form, veins are essentially precipitates of metals or minerals from aqueous solutions, whereas dikes are essentially crystallization products from molten material.

Velásquez (*vâ-läs'kâth*) or VELAZQUEZ, DIEGO RODRÍGUEZ DE SILVA Y, painter, born in Seville, Spain, in 1599; died in Madrid, Aug. 7, 1660. Although the date of his birth is uncertain, he was baptized on June 6, 1599. He was descended from a noble family and was well educated. After



PHILIP IV OF SPAIN. PAINTING BY VELÁZQUEZ

studying art under Francisco Herrera the Elder, he became a pupil of Francisco Pacheco, and subsequently married Juana, the daughter of the latter. Philip IV of Spain called him to Madrid in 1622 and appointed him imperial painter, and he remained the favorite painter of Spain until his death. He visited Italy in 1629 to study the works of Raphael, Titian, and Michelangelo, but two years later returned to Spain. He visited Italy again in 1649, when Philip commissioned him to buy works of art there. The king created him a noble in 1658 and assigned him rooms in the palace, which the king is said to have visited numerous times to watch the artist at work. Velásquez's position at the court was not only that of a painter; the king also used his services often in diplomatic missions. Velásquez and El Greco (*q.v.*) rank together as Spain's most eminent painters. Velásquez' noteworthy paintings, in addition to his many portraits of dwarfs, jesters, and similar figures, include "The Topers" ("*Los Borrachos*"), "Adoration of the Magi," "St. John in the Desert," "Brothers of Joseph," "Christ on the Cross," "Moses Taken from the Nile," and "Gardens of

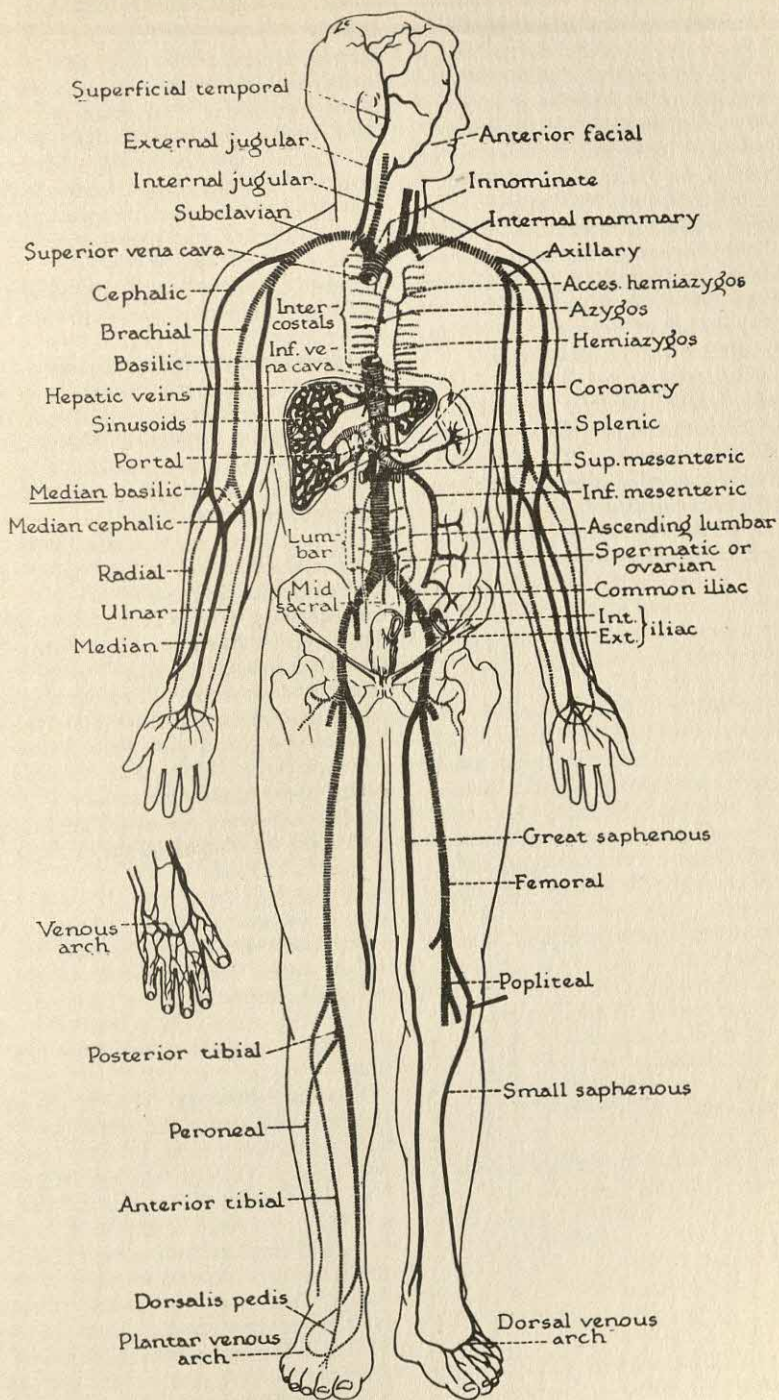


DIAGRAM OF THE VENOUS SYSTEM

This diagram shows the main superficial veins and vessels of the portal system

the Medici," a beautiful landscape painted at Rome. His "Surrender at Breda" is one of the greatest historical paintings of all time. He executed famous portraits of Pope Innocent X and of Philip IV. The art of Velázquez is characterized by the entirely individual freshness of his approach which is very near to what we would call today the Impressionistic. He combines in his painting a keen realism of observation with the monumental composition of the Mediterranean Renaissance artist. He augmented the classical inheritance from the great Italian Renaissance artists (he was influenced especially by Titian) with his personal, more dramatic concept.

Velde (*vě'l'de*), VAN DE. See *Vandevelde*.

Velocipede (*vě'lōs'i-pēd*), the general name of any light vehicle that is propelled by the person or persons who ride upon it. The first vehicle of this kind was invented in 1817 at Mannheim, Germany, and was constructed chiefly of wood. It consisted of a wooden bar about 5 ft. long and 6 in. wide, each end supported by a single wheel, and the rider sat astride on the bar and propelled the vehicle by the action of his feet upon the ground. Although it did not come into general use, this machine was the forerunner of both the bicycle and the tricycle.

Velocity (*vě'lōs'i-tē*), a term used in mechanics to express the rate at which a body travels. A related term is *speed*; conventionally, speed refers exclusively to the distance covered by the body per unit time, while velocity contains a reference to the direction of motion as well. Thus something might have a speed of 35 m.p.h. while its velocity is 35 m.p.h. to the northwest. *Constant velocity* means that equal distances are passed through in equal times in a constant direction. When either the speed or direction changes, or both, the body is said to be *accelerated*. Sometimes the term *deceleration* is used to describe a decreasing speed. *Average velocity* is the ratio between the total distance traversed in a period of time and the amount of time involved.

Velvet (*vě'l'vēt*), a familiar pile fabric, which is made by passing the warp over wires so as to form a row of loops that project from the backing, and, when the wire is withdrawn, form an uncut or piled velvet. To make *cut pile*, the name of a kind of velvet used most extensively, a knife is passed along the groove on the top of each wire to cut the pile before the wire is withdrawn. The loops thus cut form a covering resembling a very fine but short fur. Velvet of the best kind is made entirely of silk, but inferior grades are obtained by weaving silk so as to form a face on a cotton or partly woolen foundation. *Velveteen* is a fabric made of a mixture of silk and cotton. A similar product made of silk and wool is known

as *plush*. It is thought that velvet was first manufactured in China, where fine grades are still produced, and it is not known when the first products were made in Western Europe. Rich and artistic textiles were made in Italy as early as the 12th century, whence the manufacture of velvets gradually extended northward. Before World War II the most noted manufacturers of velvet textiles were at Crefeld, Germany, and in Lyons, France.

Vena Cava (*vě'nà kă'vâ*), in anatomy, one of the two large veins which carry the blood back to the heart. See also *Vein*.

Vendetta (*vě'n-dě'tă*), the name applied to the practice of individuals' taking private revenge upon their enemies, especially upon those who have murdered a relative. This practice originated in Corsica and the name is from the Latin word *vindicta*, meaning "revenge." When a murder has been committed, the relatives of the murdered man as well as the officers pursue the guilty party, and he is slain without process of law as soon as he is apprehended.

Veneering (*vě-ně'r'ing*), the art of attaching thin layers of fine-grained wood to a less costly or less ornamental material. The veneers are cut chiefly of such woods as mahogany, maple, and rosewood, and are commonly glued to the surface of fir or pine, thus giving the finished product the appearance of the more valuable material. Recent improvements in machinery have made it possible to prepare sheets as thin as paper, thus facilitating the economical use of the finer grades of woods. To fasten veneers, the surface is roughened so as to take glue readily, and pressure is applied while drying. The surface is afterward polished and finished in the same way as solid cabinet woods. Veneering is employed principally in making costly furniture and musical instruments. Thin sheets of ivory and other substances are used in some kinds of veneering. See also *Wood*.

Venerable Disease (*vě-ně'r-ē-ql*), any disease such as syphilis and gonorrhea (*q.q.v.*), arising from sexual intercourse, or other intimate contact, such as kissing, with an infected person. The word "venereal" derives from Venus, or Veneris, the Roman goddess of love. Venereal diseases have existed since earliest times, and were mentioned by Moses in a warning to the Jews. In Europe, their frequency greatly increased as a result of renewed trading with other parts of the world, beginning with the late 15th century. Ignorance, poverty, and war are some of the factors which tend to influence the spread of venereal disease. In recent years, the U.S. has concerned itself increasingly with the problem of venereal disease.

Several years before the outbreak of World War I, the U.S. Army found positive syphilis re-

actions in 16.7 per cent of the men entering service. Chapter XV of the Army Appropriation Act of July 9, 1918, authorized and directed the U.S. Public Health Service (*q.v.*) to establish a Division of Venereal Diseases to study the disease, to co-operate with state health departments, and to control the spread of the disease in interstate traffic.

Title VI of the Social Security Act made funds available to the Public Health Service for allotment to the states for the purpose of establishing and maintaining adequate health services. The Venereal Diseases Control Act of May 24, 1938, known as the La Follette-Bulwinkle Bill, established as a national policy grants-in-aid by the Public Health Service to the states sufficient for the establishment and maintenance of adequate measures for the prevention, treatment, and control of the venereal diseases. These provisions were repeated and strengthened in Public Law 410, passed in 1944.

The entry of the U.S. into World War II, on Dec. 7, 1941, speeded up venereal-disease control measures among the armed services, in war production centers, and among civilians. The problems of poor housing, juvenile delinquency, and prostitution near army camps and industrial areas have a direct bearing upon the increase of venereal diseases. The May Act forbade prostitution near army camps, and juvenile delinquency began to be dealt with by state and local agencies.

In examining its first 2,000,000 selectees, the army found the rate of syphilitic infection to be 4.5 per 100 candidates. The rate for the entire male population aged 21 to 35 was estimated at 4.8, and for the entire male and female population of all ages 2.5. Negro males aged 21 to 35 had an estimated rate of prevalence of 27.2 per cent; all white males in the same age group had a rate of 2.35 per cent.

Remarkable progress has been made in the last 10 years against the disease because of the development of new, rapid-treatment methods and of intensified techniques for discovering infectious cases.

Penicillin (*q.v.*), either alone or in combination with arsenic and bismuth, has proved to be the most rapid effective treatment yet devised. Syphilitic patients are today hospitalized in rapid-treatment centers operated by state health departments. Primary syphilis can now be cured in about two weeks, in contrast to the old procedure which necessitated arsenical and bismuth injections once a week for 70 weeks. Gonorrhea can now be cured in a few hours in a physician's office or health clinic.

Mass blood-testing, first initiated on a broad scale by Selective Service and the armed services, later conducted as campaigns in a number of cities, produced excellent results in disclosing

numerous hitherto unsuspected cases of syphilis.

Over the past decade, the number of deaths due to syphilis declined steadily from 16.2 per 100,000 population in 1936 to 8.9 (estimated) for 1947. Infant deaths, too, decreased from 57 per 100,000 live births in 1939 to 16 per 100,000 in 1946.

At present 38 states and the City of New York require some form of blood test prior to marriage in order to determine whether venereal disease exists. In 1943, Alabama undertook the eventual examination for syphilis of every person between the ages of 14 and 50.

Venesection (*vĕn-ĕ-sĕk'shŭn*), in medicine, surgical incision of a vein for the purpose of removing superfluous blood.

Venezia Giulia (*vā-nĕt'syā jōō'lyā*). See Trieste.

Venezuela (*vĕn-ĕ-zwĕ'lā*), a republic in the northern part of South America, the sixth largest political division of that continent. It is bounded on the n. by the Caribbean Sea, e. by the Atlantic and British Guiana, s. by Brazil and Colombia, and w. by Colombia. Boundary disputes of long standing with Colombia and British Guiana were finally settled by arbitration. The area is 352,143 sq. m.

DESCRIPTION. Two chains of the Andes extend into the northern part from Colombia, the eastern branch of which is known as the Merida Mts. These highlands attain elevations that range from 10,000 to 16,410 ft., while the western branch has summits from 2,500 to 4,000 ft. above the sea. The southern section is traversed by two mountain chains, the Parima and the Pacaraima, the latter forming a large portion of the boundary between Venezuela on the north and Brazil and Guiana on the southeast. The vast interior comprises the larger part of the Orinoco basin, which is formed by a series of plains or llanos of great fertility and luxuriant vegetable growth. Here are fine forests of palms, mahogany, black and white ebony, satinwood, rosewood, cinchona or Peruvian bark, and trees that yield sarsaparilla and other drugs. Wild animal life is represented in large numbers in many sections of the country and includes the jaguar, tapir, alligator, puma, monkeys, aquatic fowls, and birds of song and plumage.

The drainage is chiefly by the Orinoco into the Atlantic. This stream forms the great outlet for Venezuela and the central part of Colombia. It receives the inflow from numerous tributaries, which include the Apure, Meta, Caura, Caroni, and Casiquiare. The last mentioned connects the Orinoco with the Negro River, a tributary of the Amazon. The Orinoco is navigable throughout the country and many of its tributaries furnish transportation facilities for large vessels. Three inlets of considerable size indent the northern

shore, and include the Gulfs of Paria, Triste, and Venezuela. Lake Maracaibo, in the northwestern part, is the largest inland body of water and is surrounded by swampy land.

Venezuela is located wholly in the Northern Hemisphere, but the climate is tropical and the seasons are distinguished as the wet and dry. The lowlands of the northeast and central parts are within the warm belt, but the heat is tempered by the trade winds from the Atlantic. Here the mean temperature varies from 75° to 90° and the low and marshy lands are often the source of severe yellow fever epidemics. Rainfall is ample in all parts of the country and in the lowlands it is frequently excessive, causing a large part of the country to be flooded.

MINING. The country possesses much mineral wealth, and ranks as one of the most important petroleum-producing countries in the world. Lago la Brea, or the Lake of Pitch, is a remarkable basin about 6 m. long, situated near the Gulf of Paria, west of the island of Trinidad, and is famous for its extensive deposits of asphalt, obtained in large quantities for street paving. Salt is obtained in the Araya peninsula, copper in the Aroa district; silver, copper, and granite are abundant in the mountains. In 1950 the U.S. Steel Corp. announced one of the largest deposits of iron ore ever discovered. This claim, made in Cerro Bolívar in 1947, has been considered one of the most important events in the history of iron and steel production. Other minerals include coal, sulfur, gold, tin, kaolin, and precious stones.

AGRICULTURE. Farming is the chief industry, but not more than one-third of the area is productive. Coffee ranks as the leading product and is closely followed by cacao, sugar cane, and fruits. Tobacco thrives in the lowlands, where cotton and indigo also yield good returns, but these products are not cultivated extensively. Other products include vanilla, tonka beans, wheat, rice, and many varieties of fruits. Great herds of cattle and horses are reared on the plains. Goats, sheep, swine, and poultry are grown to some extent. Primitive agricultural methods are being gradually replaced by modern improvements.

MANUFACTURES. The manufacturing enterprises have not assumed extensive proportions and the output is intended more for home consumption than for exportation. The fisheries yield good catches for canning and curing. Advancement has been made in the manufacture of cheese and in canning fruits. Most of the establishments are in the larger cities, where electric power is available, and where cotton weaving, tanning, wool spinning, and the manufacture of boots and shoes are carried on successfully. Among the general manufactures are cement, glass, furniture, sugar, pipe tobacco and cigars, clothing, liquors, earthenware, and machinery. Venezuela's forests have

extensive natural resources, but little has been done to develop the lumber industry. The principal products are mahogany, the tonka bean, and a rubberlike gum known as balata. Much of the capital employed in both manufacturing and mining is furnished by foreign interests.

COMMERCE AND TRANSPORTATION. Venezuela has a favorable balance of trade since the exports greatly exceed the imports. The former consist chiefly of crude oil, coffee, cacao, cattle, hides and skins, balata gum, copaiba, and gold. The imports include chemicals, cotton and woolen goods, ironware, hardware, and machinery. Foreign trade is principally with the U.S., France, Great Britain, and The Netherlands.

Although the country has only a limited railroad system, transportation has been facilitated by seaports on the Atlantic and on the principal rivers. Telegraph, telephone, and air services also facilitate communication and transportation. However, much of the interior is reached only by pack mules and wagons. There are about 3,800 m. of highway suitable for year-round use. A number of canals have been constructed as a means of utilizing some of the rivers and Lake Maracaibo for navigation.

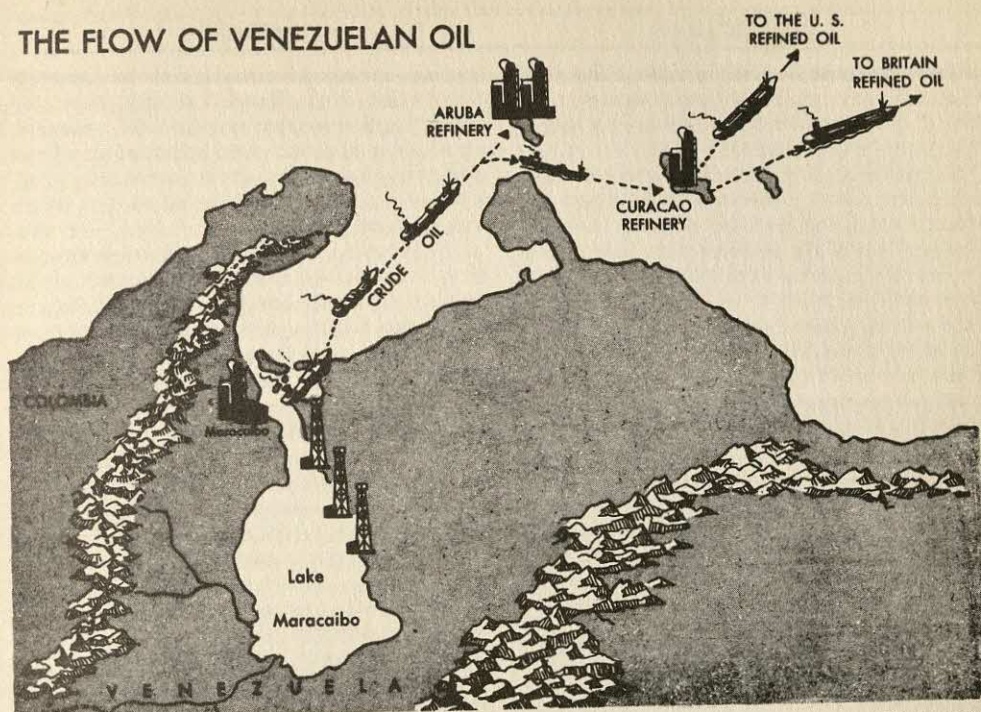
EDUCATION AND RELIGION. School attendance has been free and nominally compulsory since 1870, but a majority of the adult population cannot read nor write. Elementary schools are maintained in all the populated districts. There are also many normal and vocational schools and private and parochial institutions. Three universities, maintained by the state, are located at Merida, Carácas, and Maracaibo. A national museum and library are maintained at Carácas. Roman Catholicism is the prevailing religion, but general freedom in matters of faith prevails.

POPULATION. The great majority of the people are of mixed Spanish and Indian blood, with only 12% of the population representing pure European stock, 10% pure Indian, and 10% pure Negro. The latter are found primarily along the coastal regions. Spanish is the official and spoken language. Population 1950, 6,280,000.

GOVERNMENT. Venezuela is governed by a military junta which overthrew the dictatorship of Gen. Marcos Pérez Jiménez in January 1958. The new government then suspended the constitution of 1953 and dissolved the national congress, pending new elections that were scheduled for the end of 1958. Caracas is the capital city. The bolivar is the monetary unit (see *Coinage*).

HISTORY. Columbus visited the coast of Venezuela in 1498, and the following year the Spaniard Alonso de Ojeda (1465?-1515) explored the area. De Ojeda supposedly named the place Venezuela, meaning little Venice, because of the lake dwellings he had seen along the shores of Lake Maracaibo. Venezuela, which

THE FLOW OF VENEZUELAN OIL



Courtesy Office of Inter-American Affairs, Wash., D. C.

was colonized by Spaniards (the first settlement was made *ca.* 1520), remained under Spanish rule for three centuries. In 1811 Simón Bolívar (*q.v.*) became head of a revolutionary movement in Venezuela; after many reverses, this group decisively defeated the Spanish and royalist forces at Carabobo on June 24, 1821. Subsequently, Venezuela was included in the Gran Colombia federation but declared its independence from this organization in 1830.

The country underwent a number of revolutions and civil wars in the 19th century, with rival generals establishing military dictatorships. During this period, democratic constitutions were promulgated, but devices were always found by which the current military dictator could maintain real power behind a façade of democracy. A notable democratic step forward was taken, however, with the abolition of slavery, in 1854, by presidential decree.

Venezuela was also beset by border disputes with its neighbors during this period. In 1891 a border dispute with Colombia was settled by the king of Spain in favor of Colombia. In 1895 war with Great Britain, over the border between Venezuela and British Guiana, was prevented by the intervention of the U.S., which threatened to invoke the Monroe Doctrine; the dispute was eventually settled amicably in favor of Great Britain. Another international crisis was reached in 1902, when Great Britain, Italy, and Germany blockaded some of the Venezuelan ports as a means of securing adjustment of claims by their nationals against the financially chaotic

government of the dictator Cipriano Castro. The dispute was submitted to the Permanent Court of Arbitration (now World Court) at The Hague.

Castro was deposed as president in 1908, and a new dictatorship by Juan V. Gómez was established, which continued until 1935. The discovery and development of an oil industry helped straighten out the finances of the military dictatorship of Gómez and made Venezuela one of the most solvent of the South American republics. After a period of constitutional government following Gómez's death in 1935, another revolution occurred in 1945, and in 1948 a military junta, headed by Marcos Pérez Jiménez and Carlos Chalbaud, seized power. Chalbaud, who was president of the junta until his assassination in November 1950, was succeeded by Germán Suárez Flamerich, who in turn was deposed by Jiménez in 1953. Jiménez was overthrown in January 1958, and a military group, headed by Rear Adm. Wolfgang Larrazabal, took control of the country. The Larrazabal government was unable to maintain order in Caracas during a good-will visit of U.S. Vice President Richard M. Nixon on May 13, 1958. The Nixon entourage was attacked by a mob and the Vice President narrowly escaped being dragged from his car.

Venice (*vě'n'is*), a seaport city in northern Italy, on the northeastern shore of the Adriatic Sea, 20 m. E. of Padua. It is situated on a number of islands in the Lagoon of Venice, a shallow sheet of water separated from the Gulf of Venice by a long sand bank, and is connected with the mainland by a railway viaduct about 2 m. long.

The city is one of remarkable beauty, being built on 120 islands, and the various sections are connected by more than 400 bridges. The islands rise only a few feet above the water, and most of the buildings rest on piles constructed of stone. The Grand Canal (*Canale Grande*) divides the city into two parts. It is crossed by a number of magnificent bridges, of which the Rialto is the most beautiful, being lined with decorated shops and counters. The streets of Venice are formed by the different canals, on which transportation is provided by steamboat and motorboat and the typical Venetian gondola (*q.v.*).



Courtesy Italian State Tourist Office

VENICE. PIAZZA SAN MARCO

The Piazza San Marco is the focal point of the city and one of Europe's most beautiful squares. Enclosed on three sides, it is dominated by the west facade of the Cathedral of St. Mark, which faces the east side of the piazza. Named after St. Mark, the patron saint of Venice, the 250-ft.-long and 170-ft.-wide church dates chiefly from the 11th century but was enhanced by Gothic additions built in the form of a Greek cross with equal arms. The church is covered by five cupolas of Oriental magnificence. Above the portal, there are four gilded, 5-ft.-high, bronze horses, Greek works of the 4th or 3rd century B.C. The lower parts of the cathedral's interior walls are rich in marble decor, and the upper parts, especially the domes, are decorated with glowing mosaics, depicting scenes from the Scriptures.

In addition to tourism, the city's commerce

rests on the manufacture of glassware, lace, silk, and jewelry. International festivals, such as the biennial exhibition of modern art and an annual motion-picture competition, perpetuate the fame of Venice as a cultural center which was established centuries ago by its master architects, sculptors, and painters.

The Venetian palatial style is an outgrowth of the Lombard-Romanesque architecture of the 11th through 13th centuries. Famous architects in later periods were, in the 15th century, Antonio Rizzo; in the 16th, Jacopo Sansovino (originally Tatti); and, in the 17th, Baldassare Longhena. Byzantine paintings were equaled in Venetian mosaics. The High Renaissance is represented by such famous painters as Titian, Paolo Veronese, and Tintoretto (*qq.v.*). In the 18th century the painters Tiepolo, Antonio Canale (Canaletto), and Guardi (*qq.v.*) kept Venetian art in high esteem. There are a number of museums and other cultural institutions, such as the Museo Correr, housing collections of local interest; the Museo del Risorgimento, which has a large gallery of Venetian paintings of the 15th and 16th centuries; and the Library Vecchia, a famous 16th-century structure, which houses art works of great Venetians. The number of celebrated churches and private and state palaces is, however, too large to be discussed here. See also *Art*.

Venice, which derives its name from the Veneti, an ancient people of northern Italy, came into being in the 5th century, when refugees from the barbarian invasions formed a community at the mouth of the Brenta River, in the lagoons and islands of Venice. For several centuries little progress was made, but under the first doge, Paulo Lucio Anafesto (elected in 697), bridges were built to unite the islands. Until the 10th century, Venice remained under the domination of the Byzantine Empire, but trade was stimulated by the Crusades and Venice, consolidating its population and commerce, secured control of the surrounding mainland. With the fall of Constantinople in 1204, which was largely a victory won by the doge Enrico Dandolo (1192-1205), Venice made large territorial gains. Through the 16th century, the republic was probably the most powerful entity in Italy. Although the Venetian decline was slow, the growing strength of the Ottoman Empire began to prevail, and the diminished importance of the Mediterranean as a trade route added to the republic's difficulties. Venice still retained, however, a great deal of its cultural splendor. In 1797 Napoleon took possession of the city and by the treaty of Campoformio (*q.v.*) gave it to Austria. Between 1805 and 1815 it was part of the kingdom of Italy formed by Napoleon. In 1866 it was annexed to Italy, later becoming the capital of Venezia province. Population, 1951, 322,457.

Venice, GULF OF, an extensive inlet of the Adriatic Sea, forming the southeastern boundary of Venetia, a province of northern Italy. The extent is about 60 m., from the delta of the Po to the mouth of the Tagliamento, and east of it is the shallow Lagoon of Venice and numerous islands. The northern extension is known as the Gulf of Trieste. The rivers flowing into it include the Brenta, Adige, and Piave.

Veni, Vidi, Vici (*ve'nī, vī'dī, vī'sī*), Latin meaning "I came, I saw, I conquered"; phrase inscribed by Caesar on his triumphal banners after his victory in Pontus, a Roman province.

Venizelos (*ven'ē-zā'lōs*), ELEUTHERIOS, statesman, born in Murnies, Crete, Aug. 23, 1864; died Mar. 18, 1936. As Greek premier he initiated the reform of the Greek constitution. Opposed to the neutrality of Greece during World War I, he formed, with others, the provisional government of national defense in Saloniki (1916), joined the Allies, and acted successfully as champion of Greek interests during the peace parleys in Paris (1919). Resigning in 1920, he was elected president of the National Assembly in 1924, but abdicated soon. In 1928-33, however, he was premier again. In 1935 he staged an unsuccessful military revolt against the government, for which he was exiled and court-martialed, but was finally pardoned by King George II (1935).

Ventricle (*ven'trī-k'l*), in anatomy, any kind of small cavity in the human body. There are ventricles of the heart, of the brain, etc.

Ventriloquism (*ven-trīl'ō-kwīz'm*), the art of speaking or producing tones in such a manner that the hearers are led to believe that the sounds come from a different source than from the person uttering them. It depends wholly upon practice and dexterity. The secret of the art is in taking a deep inspiration, allowing the breath to escape slowly when speaking, and controlling the exhalation with the muscles of the palate and the larynx. This can be done without materially moving the lips, and the operator completes the illusion by engaging the attention of the hearers by various sleight-of-hand performances, or by apparently carrying on a conversation with a lay figure, or dummy. The art is of great antiquity, being mentioned by both Jewish and Greek writers. Zera Simon and Professor Wyman were two Americans who attained wide reputations as ventriloquists. The convincingness of the art is attested by the very human personality given to dummies, enough to make them seem almost real people on the radio, as, for example, the contemporary "Charlie McCarthy."

Venus (*ve'nūs*), the most brilliant of all the planets. It is classed as one of the inferior planetary bodies, having its orbit between those of the earth and Mercury. The ancients called it *Lucifer*, or the *Morning Star*, when visible before sunrise,

and *Hesperus*, or the *Evening Star*, when it shone in the evening after sunset. Its general appearance is the same as that of Mercury. The mean distance from the sun is about 67,000,000 m. It makes a complete revolution around the sun in 224.7 mean solar days; hence, its year is equal to about seven and one-half of our months. The diameter of Venus is estimated at 7,700 m. While the density is about the same as that of the earth, the volume of the planet is about four-fifths as great. The time of rotation of Venus around its axis is still uncertain. Some observers have found indications of a rotation slightly faster than the earth's, while others contend that the planet always turns the same side toward the sun, as the moon does with the earth.

Shining only by reflected sunlight, the planet shows a succession of phases like the moon. When near the line joining the earth to the sun, Venus appears as a thin crescent and on rare occasions transits across the surface of the sun (see *Transit*). Venus is not known to have any satellites.

Venus, in Roman legend, the goddess of beauty and love, identified with the Aphrodite of the Greeks, who is regarded as the daughter of Zeus and Dione. It was supposed that she had sprung from the foam of the sea and that she first visited the island of Cythera, whence she proceeded to Cyprus. These two islands were her principal dwellings. Though sought by many of the gods, she chose to marry Vulcan, but her fidelity to her husband was questioned more or less, and her intrigues with Adonis were celebrated by Shakespeare and other classic poets. The dove, sparrow, and swan were her favorite birds, and she held sacred the rose, apple, and myrtle. Her children included Aeneas, the Trojan hero, and Cupid, the god of love. In statuary she is represented with her son, Cupid, in a chariot drawn by doves, or by swans or sparrows. Annual festivals, called *Veneralia*, were held in her honor. Among the most famous statues of Venus are the "Venus of Melos," the "Venus of Cnidus," and the "Venus of Capua."

Venus of Melos, a famous Greek statue of Venus, dating to ca. 400 B.C. Now in the Louvre Museum, Paris, it received its name from the Greek island of *Melos* or *Milo*, located in the Cyclades, where the statue was found in 1820.

Venus's Flower Basket (*ve'nūs'z flou'ēr bās'kēt*), the name of a vitreous sponge, so called from its beautiful form and appearance. Several species of these sponges are found in the warm seas of Asia, especially in the vicinity of the Philippines and the East Indies. The skeleton of these animals resembles spun glass in appearance and the patterns found are often remarkable.

Venus's Flytrap (*ve'nūs'z flī'trāp*), a plant native to North America, found along the sandy shores of North Carolina and elsewhere. It be-

longs to the family of sundews and is so named from its peculiar leaves, the upper portion of which are provided with hairlike feelers that are extremely sensitive to the touch. When small insects come in contact with this traplike formation, it closes down upon them quickly and absorbs the soft parts as a food. The leaves appear to lose a part of their power to act in this way, though they sometimes serve to catch two or three insects.

Veracruz (*vēr'ā-kroōz*), a seaport city in Mexico, in Veracruz State, on the Gulf of Mexico. Situated on a low coastal plain, ca. 260 m. e. of Mexico City, it is a railroad terminus. A major commercial center in an oil-producing region, Veracruz is also a resort, with notable beaches to the south. Local manufactures include cotton and jute goods, sugar, and jewelry. In the harbor is the 17th-century Castillo de San Juan de Ulúa, built as part of the city's defenses and later a prison. Hernando Cortez landed at Veracruz in 1519; the French took it in 1838 and 1861, and the U.S. held it in 1847 and briefly in 1914. Population, 1959 (est.), 138,012.

Veracruz, a state of Mexico, on the Gulf of Mexico, in the eastern part of the country. It has an area of 27,759 sq. m. Mountainous in its central region, the state is primarily a coastal plain, sloping from the west—the Sierra Madre Oriental or Eastern Sierra Madre—to the Gulf. The major industries are concerned with agriculture; Veracruz is one of the most fertile parts of Mexico, producing sugar cane, cacao, tobacco, and many other crops. There are commercially exploited oil deposits and other minerals. Jalapa is the capital, and Veracruz is the chief city. The Univ. of Veracruz, founded in 1944, is in Jalapa. Population, 1957 (est.), 2,393,000.

Verb (*vērb*), a word which expresses action, being, or state of being, and which serves to denote the principal part of what is stated about the subject. With respect to their use, verbs are either copulative or active. A *copulative verb* asserts the predicate of a proposition, or of the subject, as in the sentence, "Iron is hard." *Active* verbs are divided into transitive and intransitive verbs. A *transitive verb* requires an object to complete its meaning, as "The scholar learned his lesson"; and an *intransitive verb* does not require such an object, as "The grass grows rapidly." Verbs are termed *active* or *passive*, depending upon whether the subject acts or is acted upon, and a third class is known as *neuter* verbs, which imply being or condition. Verbs, with respect to their form, are either *regular* or *irregular*. The properties of verbs are *voice*, *mode*, *tense*, *number*, and *person*. Verbs which are used in the conjugation of other verbs are called *auxiliary* verbs. See *Participle*.

Verbena (*vēr-bē'nà*), a large genus of flower-

ing plants of the vervain family. They have four-sided stems, opposite or alternate leaves, and flowers in racemes or terminal spikes. Seventy species have been described, most of which are native to America, and many are prized in cultivation. The *nettle-leaved verbenà* is 3 to 6 ft. high. It has long spikes with small white flowers. Other species are the *blue*, *garden*, *bracted*, and *Rocky Mountain* verbenas. They take the form of herbs in temperate climates and grow as shrubs or trees in hot countries. All the species are easily hybridized. Several of these plants yield medicinal properties. The *lemon grass*, a species of verbenà, yields the oil of verbenà.

Vercingetorix (*vēr-sin-jēt'ō-rīks*), leader of the Gauls and of their great revolt against Rome and Julius Caesar. The Gallic chieftain was of the Averni (Auvergne) tribe, and it was during Caesar's invasion of Gaul (especially described in Caesar's "Commentaries," Book VII) that Vercingetorix was defeated and captured. He was taken to Rome and put to death in 46 B.C.

Verdi (*vēr'dē*), GIUSEPPE, composer, born in Le Roncole, in the Italian Duchy of Parma, Oct. 10, 1813; died in Milan, Jan. 27, 1901. Of peasant stock, Verdi inherited a strong constitution, a vigorous mind, and great tenacity of spirit—all of which served him well during a long life filled with intense creative activity. His musical career began early, under the patronage of Antonio Barezzi, a grocer in Busseto to whom he was apprenticed. The discerning Barezzi recognized the boy's genius, paid for most of his musical education, and eventually became his father-in-law. At 19 Verdi's mettle met its first severe test. He was rejected as a student by the conservatory at Milan (1832), on the grounds that he lacked musical ability—this in the same city where his music-dramas would one day shed new luster upon La Scala, the world's most famous opera house. Humiliated but undaunted, he remained in Milan four years to study the fundamental principles of music with Vincenzo Lavigna of the La Scala Orchestra; during this period he composed two symphonies and a cantata, usually lost sight of in the volume of his later work.

In 1836 Verdi returned to his native Parma, married Margherita Barezzi, and began a four-year engagement as conductor of the local philharmonic orchestra. His first opera, "Oberto" (Milan, 1839), met with an encouraging degree of success—though tragedy followed. Shortly afterward, the young composer was stunned by the loss of his two children, then by the death of his wife (1840). Failure of his second opera, in that same year, added to his grief, might have closed the career of a lesser man, but Verdi went grimly on with his work. He returned to Milan, and in 1842 the doors of La Scala were opened to



GIUSEPPE VERDI

him. His opera "Nabucco" produced there was an instantaneous success, and from that moment his career as a composer was assured. This opera served also as means of restoring happiness to Verdi, for here he met the young singer, Giuseppina Strepponi, who was the first interpreter of the "Nabucco" arias and several years later became his wife.

Following "Nabucco," the parade of operas started by "Ernani" in 1844 included many which had premieres in foreign capitals as well as those heard first in Italy. "I due Foscari" (Rome, 1844) served as Verdi's introduction to America when it was performed in New York City two years later. "I Masnadieri" was given its premiere in London (1847), and "Luisa Miller" (taken from Schiller's "Kabale und Liebe") appeared in 1849. The next three operas, which are still popular favorites in every repertoire, established Verdi's fame upon a lasting foundation. "Rigoletto" was the first of these (1851), followed by the equally famous "Il Trovatore" and "La Traviata," both produced in 1853. After that came "I Vespri Siciliani" (1855), "Simon Boccanegra" (1857), "Un Ballo in Maschera" (1859), "La Forza del Destino" (1862), and "Don Carlos" (1867). The climax was reached in "Aïda," written to celebrate the opening of the Suez Canal and first performed in Cairo on Christmas Eve, 1871.

In that same year, at the height of his fame, Verdi retired from opera composition to spend his later years working on instrumental music, which included the famous "Manzoni Requiem," first performed in 1874. The greatness of the long series of operas produced before Verdi's retirement was partly overshadowed during his lifetime by the towering and spectacular genius of Richard Wagner (*q.v.*), but they are now regarded as the prototype of the Italian opera form as opposed to the formal German school of the period. Cast in a lighter and more fluid mold,

VERDUN

Verdi's work is distinguished by the skillful manner in which the separate musical parts are interwoven. Arias, duets, choruses, quartets, recitatives—each a gem in its own right—are linked together in a natural, coherent way which leads the action and the music inevitably to the climax of the opera. The popularity of these operas in our own day bears witness to the composer's power of musical and dramatic invention, while the contagious charm of his melodies has made them universal favorites for orchestras, for recordings, even for the once widespread hand-organ. Romantic in theme, lyrical and melodious in style though the operas are, many of them reflect in theme, songs, or choruses, Verdi's interest in the political problems of his day—an interest strong enough to make him serve from 1860-65 in Italy's first National Parliament, and to bring him the honor of nomination as a senator in 1875.

In 1887, at the age of 74, Verdi emerged from his 16 years of retirement to startle the world with a new opera, written in a style entirely different from that of his earlier works, combining their richly musical quality with a new, dramatic sweep and power characteristic of the German rather than the Italian school. This opera, "Otello," was taken from Shakespeare, as was the equally glorious "Falstaff" which followed in 1893 when the composer was 80 years old. Such a resurgence of power, added to the world-wide popularity of the earlier operas, has given Verdi a unique position. His contribution to the art of the opera is unquestioned, but even today it is difficult to estimate the far-reaching impact of his genius, not only upon his own time, but also upon the present and the future of operatic music.

Verdun (*vêr-dûn'*), a city of France, on the Meuse River, 43 m. w. of Metz. The noteworthy features of the city include the cathedral, the public library, and a chain of strong forts. In 843 the treaty by which the sons of Louis the Pious divided the Frankish Empire among themselves was signed in Verdun: by its provisions the land east of the Rhine, together with the districts around Mainz, Worms, and Spire on the left bank, were added to the growing German Empire. In the 10th century, Verdun was conquered by Germany, but was ceded to France in 1552, and captured by the Germans in 1870. In 1915, during World War I, the German Gen. von Falkenhayn chose Verdun as the target of a large-scale offensive which began in February 1916. It was marked at first by distinct success, but ultimately resulted in an Allied victory with heavy German losses. During World War II it was seized by German forces in June 1940 and recaptured by the Allies in the latter part of 1944. Population, *ca.* 19,000.

Vere (*vâr'e*), a town in the northeast corner of the island of Walcheren, in the province of Zeeland, in The Netherlands. The modern municipality of Vere has an area of 1,506 acres, and is situated on the northern entrance of the canal through Walcheren. It was originally called *Kampvere*, meaning "Kampen Ferry," because it was founded by inhabitants of Kampen, who in 1170 built a dike around a piece of land that was inundated on the island of North Beveland, lying opposite Vere. By the 16th century, Vere had become an important, prosperous city, but has since declined until it is now a small fishing village. The town boasts a 16th-century city hall built in Gothic style, a large town fountain, and some old mansions, *Het Schotsche Huis* (The Scottish House) and *De Gulden Struys* (The Golden Ostrich), both built in 1564. The "Great Church," finished in 1348, dominates the whole town with its massive tower. Taken by the Germans in World War II, the city was returned to The Netherlands following the defeat of Germany in 1945.

Vereshchagin (*vyę-rę-shchü'gyin*), VASILII VASSILIEVICH, painter, born in the government of Novgorod, Russia, Oct. 26, 1842; died Apr. 13, 1904. He studied in Russia and later became a pupil of Gérôme at Paris. He enlisted for military service in the Turcoman campaigns in 1867, traveled in Turkestan, the Himalayas, in India and Tibet, and later served in the Russo-Turkish War of 1877. Subsequently he visited Syria, Persia, and India, turning his travels to good account in various paintings. The Russian authorities employed him to paint a number of scenes in connection with the execution of nihilists. At the time of the Spanish-American War he visited Cuba. He painted many scenes in the Russo-Japanese War and lost his life when the *Petropavlovsk* was sunk at Port Arthur. Vereshchagin's work, of which a drawing in the Salon of 1866 was the first proof shown to the public, is especially characterized by its many depictions of the various wars which the artist saw. Among his leading works are "The Route to Plevna," "Long Forgotten," "The Emir of Samarkand," and "The Pyramid of Skulls." His series "1812," scenes from Napoleon's Russian campaign, painted in 1893 in Moscow, where the artist lived eventually, show clearly the inspiration he got from Tolstoy's "War and Peace."

Vergil (*vēr'jil*) or VIRGIL, Roman name PUBLIUS VERGILIUS MARO, poet, born near Mantua, Italy, Oct. 15, 70 B.C.; died in Brindisi, Italy, Sept. 21, 19 B.C. He studied rhetoric and philosophy in Rome, then returned to his home to administer his little estate. The more his poetic fame increased, the more he was helped by members of the Roman aristocracy, especially Augustus and Maecenas. Since he was never in

good health, he worked very slowly, taking many years to complete each of his poetical works. After completing the "Aeneid," he left Italy for Greece, planning to spend several years in that country and in Asia, putting the finishing touches to the poem. In Athens he met Augustus, who persuaded him to return to Italy, but on the voyage he fell ill and he died before reaching Rome.

His main works are the "Eclogues," the "Georgics," dedicated to Maecenas, and his greatest work, the "Aeneid." The "Eclogues," composed between 42 and 37 B.C., are pastoral and allegorical poems, giving an idyllic description of country life and of the life of a shepherd, in imitation of the famous idylls of Theocritus (flourished 3rd century B.C.). The "Georgics," a group of didactic poems composed between 37 and 30, deal with husbandry, agriculture, arboriculture, and other phases of Italian rural life. Both works are typical examples of the so-called school poetry of the Romans, by which the Roman writers of the 1st century B.C. tried to prove that they were able to produce literature which could be compared with that of the Greeks. However, the works of Vergil—full of interesting facts about Roman life in his time—are of more interest to philologists and historians than to the average reader, although some passages have undeniable beauty.

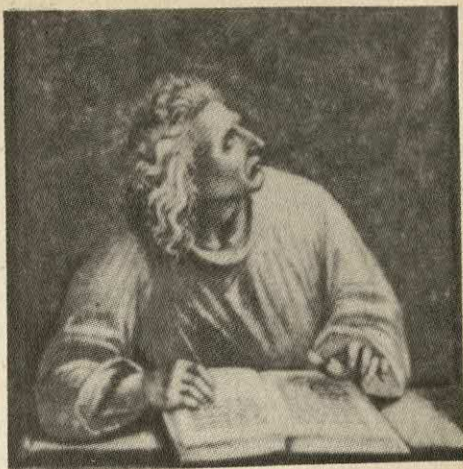
In contrast to the "Eclogues" and "Georgics," the "Aeneid" is one of the greatest poems of all time. Any artificiality which may have been a part of Vergil's two earlier works is abandoned here. The overwhelming sweep of this monumental narrative makes it actually comparable to the Homeric "Iliad" and "Odyssey," which were its prototypes. The "Iliad" and "Odyssey," however, were products of an anonymous legendary writer, probably of many writers; they were passed on by many generations who presumably changed and augmented them, so that they finally became the purest expression of the soul of the whole Greek people. In the "Aeneid," one individual man undertook to create something similar and succeeded.

The "Aeneid" was completed in 19 B.C. and published on the command of Augustus after Vergil's death, by his friends Varius and Tucca. Its 12 books, obviously following the example of Homer, tell the fate of Aeneas (*q.v.*), who was considered by the Romans as the personage who represented the connection between Roman history and Greek mythology. In Homer's epics, he is a Trojan hero; Vergil takes up his fate after the destruction of Troy. Aeneas, carrying his father on his back and leading his son, leaves the burning city, collects a band of followers, and sails toward Italy. After many adventures, he arrives in Carthage where the queen, Dido, con-

ceives a passionate love for him. Ordered on by Zeus, he leaves her and in her despair she commits suicide. A storm forces him ashore in Sicily, where many of his followers desert him, but Aeneas continues onward. Eventually he lands in Latium, where he wins Lavinia, the daughter of the king, and becomes the ruler. The last books of the "Aeneid" tell of his almost constant wars with neighboring nations and of his final victory over Turnus, king of the Rutuli. His son, Ascanius or Iulus, was the first king of Alba Longa and thus the ancestor of Romulus and Remus, legendary founders of Rome.

The numerous adventures of gods and human beings, told with great poetic beauty, give proof of Vergil's creative imagination. Since the "Aeneid" was written, it has been read by generations and has greatly stimulated the imaginations of sculptors and painters. Medieval miniaturists, as well as the artists of the Renaissance and Baroque periods, depicted Aeneas and his old father and countless episodes from the "Aeneid." French artists of the 18th and early 19th centuries never tired of illustrating Vergilian scenes. This reflection in painting and sculpture represents only a small part of the influence of Vergil on posterity. He has always been considered the national poet of the Italian people, and even in France all epic poetry was nothing more than an imitation of Vergil until the 18th century. The study of Roman literature everywhere has been based on Vergil. His sentences became the example of grammar and his writings stimulated hundreds of new poems, plays, and operas from the 13th century to the 20th. The most important example of this influence was the revival of the figure of Vergil by another great Italian poet, Dante (1265-1321), who in his "Divine Comedy" made Vergil his guide through Purgatory and Hell—one more proof of Vergil's lasting fame in the consciousness of the Italian people.

It is interesting to note that Vergil, the poet of mythological figures, became himself a mythological figure. His work was preserved in medieval and pre-medieval monasteries. Early Christian writers of the 4th and 5th centuries, among them St. Augustine, believed that he was a kind of pioneer of Christianity and they collected quotations from the "Aeneid" in an attempt to prove that he turned from Roman polytheism to pre-Christian monotheism. Other quotations were conceived of as Messianic prophecies. Religious paintings range him with the sibyls, who prophesied to the emperor Augustus the appearance of Christ. Thus, for the medieval mind, he gradually took on the aspect of a prophet and of a wizard. Between the 11th and the 16th centuries, there are many examples of myths and fables in which the demonic wizard Vergil plays a role, thus serving as a connecting link between pagan and



VERGIL

From a painting by Luca Signorelli (1441-1523)

Christian worlds in both intellect and feeling.

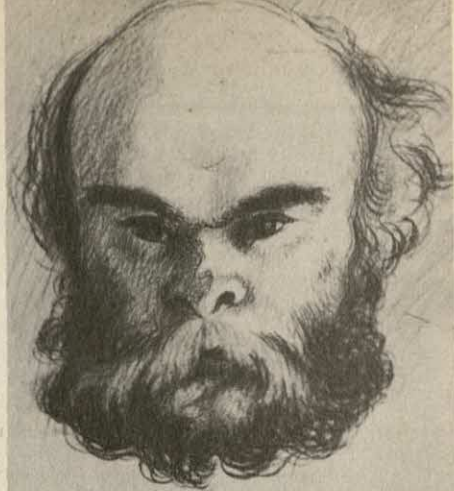
Verhaeren (vēr-hă'ren), ÉMILE, poet, born near Antwerp, Belgium, May 21, 1855; died at Rouen, France, Nov. 27, 1916. Educated at Brussels, Ghent, and the Univ. of Louvain, he was admitted to the Brussels bar in 1881. There he began to write and for a time edited *La Jeune Belgique* and *L'Art Moderne*. His first volume of poetry, "Les flamandes" (1883), dealt colorfully with the Flemish landscape. "Les moines" (1886) was somewhat more subdued and thoughtful. Following the poet's nervous breakdown (1887-91), "Les soirs," "Les débâcles," and "Les flambeaux noirs" showed a tendency toward psychological reflection and mysticism, revealing a deep inner despair. During the following years, Verhaeren created most of the works which made him a leader in a movement which swept the whole of literary Europe then. It was sometimes vaguely called "Symbolism" (*q.v.*), sometimes called "Unanimism" (*q.v.*), an expression which refers more to related philosophy than to literary production. Verhaeren's mastership is distinguished by the combination of an outspoken pictorial visual description with psychological insight, by the amalgamation of factual statements with the human emotions that are motivated by the carefully depicted outer world. Thus he accepts modern materialism in all its manifestations, considering poetic even subjects which had not been thought of in that way by preceding poets, except perhaps by Walt Whitman, then entirely unknown in Europe. He achieves marvelously effective plastic representations, whether real or symbolic. In "Les villes tentaculaires" (1895), the cities vibrate to the roar of factories, which like octopi drain the strength of teeming populations of working people and the resources of the whole regions.

Verhaeren employs liberal verse forms. The

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verse is still rhymed, but the use of varied lengths of line makes the movement free and unconventional, again suggesting Walt Whitman. It gives the impression of speed and strength and flexibility, and dramatic effects are heightened by marked accents and cadences.

His later work includes "Les apparus dans mes chemins" (1891), "Les campagnes hallucinées" (1893), "Les villages illusoires" (1895), "Petites légendes" (1900), the trilogy, "Les forces tumultueuses" (1902), "La multiple splendeur" (1906), and "Les ailes rouges de la guerre" (1917). Verhaeren also produced a volume in prose, "Les contes de minuit," and three dramatic pieces, "Le cloître" (1900), "Philippe II" (1901), and "Hélène de Sparte" (1912). Most of Verhaeren's works were translated into Eng-



Courtesy French Press & Information Service, N. Y.

PAUL VERLAINE

fied his creative abilities so that he now began writing his most wonderful poetry. In 1881 he published the collection "Sagesse" (wisdom), which at once made him one of France's greatest poets. However, in spite of his reputation his life did not become more disciplined nor he himself more socially adjusted; after repeated travels in England and France he continued leading a Bohemian life in Paris, especially after his mother's death. Verlaine died worshiped in the literary circles of Montmartre, but in miserable economic circumstances. Verlaine's first volume of poetry, the "Poèmes saturniens," was published at his own expense in 1866 and met with no particular success. The combination in these poems of a hedonistic philosophy with the endeavor for the subtle forms is characteristic for the literary trends of this time. His next collection, "Fêtes galantes" (1869), contains some of the most magically harmonious poems of all time; they exhale a misty atmosphere, a dream-world of melancholy and longing set in an 18th-century landscape. "La bonne chanson" (1870), composed in honor of his bride, represents a distinct transition from objective poetry to the music of pure sentiment. This is perhaps best expressed in the beautiful "Romances sans paroles" (1874), whose melody evokes his most intimate moods. It was the collection "Sagesse," however, which made him not only well known but actually a great poet by the completely original form of symbolistic expression. The combination of sensual passion and mystic insights, the ability to articulate the finest nuances of feeling and awareness of the external world, rank him as the true originator of a new form of French poetry.



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lish and German; these translations contributed strongly to the development of English and German literature after 1900.

Verlaine (*vēr-lân'*), PAUL, poet, born in Metz, Lorraine, the son of a French army officer, Mar. 30, 1844; died in Paris, Jan. 8, 1896. He was educated at the Lycée Bonaparte in Paris and in 1851 became a clerk in an insurance company. His marriage to Mathilde Sivy in 1870 soon ended in disaster. In the following year he went off to northern France, Belgium, and England with Arthur Rimbaud, a young poet 10 years his junior. Their perpetual quarrels ended in a pistol shot fired by Verlaine, which sent the latter into prison for two years. In prison he became converted to Catholicism, which deepened and solidi-

